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## IMPROVED BOAT-LOWERING, DETACHING, ATTACHING AND GRIPING APPARATUS.

It has happened to the writer of this to see a fellow-being, who had fallen from a vessel under way, sink forever beneath the surface before a boat could be lowered and sent to his rescue. A large ship, in rapid motion, cannot be stopped as soon as might be supposed; and if the boat is so suspended that it cannot be placed in the water while the ship is moving, there must be quite a distance to row back before the object or person lost overboard can be reached. Hence, every second of time in lowering and casting-off a boat is of value. The apparatus illustrated in the accompanying engraving appears, from its mechanical nature, to be admirably adapted to its purpose, and the thorough trial of it, both in harbor and at sea, shows that it works well in practice. We give the inventor's own description of it:—

Fig. 1 represents the boat in the act of being lowered; Fig. 2, the longitudinal section of a boat, showing the attaching and detaching methods, as at A A and D D *k k k*, &c.

The "hooking-on" or attaching is done to the outside of the boat; the lower block of the "falls" having a ring, R (Fig. 2), which, with one effort of one hand, is easily put under the hooks, knocking up the tongue, T (Fig. 5), which, by its own gravity, falls back immediately, and keeps the ring in its place. I claim for this method of "hooking-on" the following advantages, viz.: first, the comparative ease of attaching the falls to the boat *outside*, instead of inside; second, the men do not have to *hold* the blocks in their places after hooking-on at the risk of crushing their hands; third, the falls having single "secret blocks" with swiveled rings, are always kept clear when a boat comes alongside on a dark night in rough weather. The loss of one sheave in the lower block of the falls gains one-fourth time in hoisting (which is a great *desideratum*), and the loss of one-fourth power is compensated for by using anti-friction bushed sheaves in all the blocks. These attaching hooks form the head of the stem of all boats, and of the stern-post of a double-headed boat. For the stern of a square-stern boat, the hook is somewhat different in outline. The hook forward partakes of the precise form of the stem itself, and is so made that collision cannot injure it, except at the risk of destroying the boat. The boat is first hoisted-up by her improved tackling and attaching hooks; and, when at the davits, the chain pendants, P P (Fig. 2), are hooked to the detaching hooks, D D, as illustrated by Figs. 3 and 4. These detaching hooks are connected from their latches, *f f* (Figs. 3 and 4), by the small chain or wire rope which leads along under the gunwale of the boat, as represented in Fig. 2. Now, when the middle of the chain is pulled down to T (Fig. 2), the ends of the latches, *f f*, are drawn up against the "toggles," *t t* (Figs. 3 and 4). A pin is put into a hole, in a knee, over the middle of the chain at T (Fig. 2); the falls are unhooked, and the blocks stopped to the davits, B B (Fig. 1), and the boat is thus transferred to her pendants, ready for lowering.

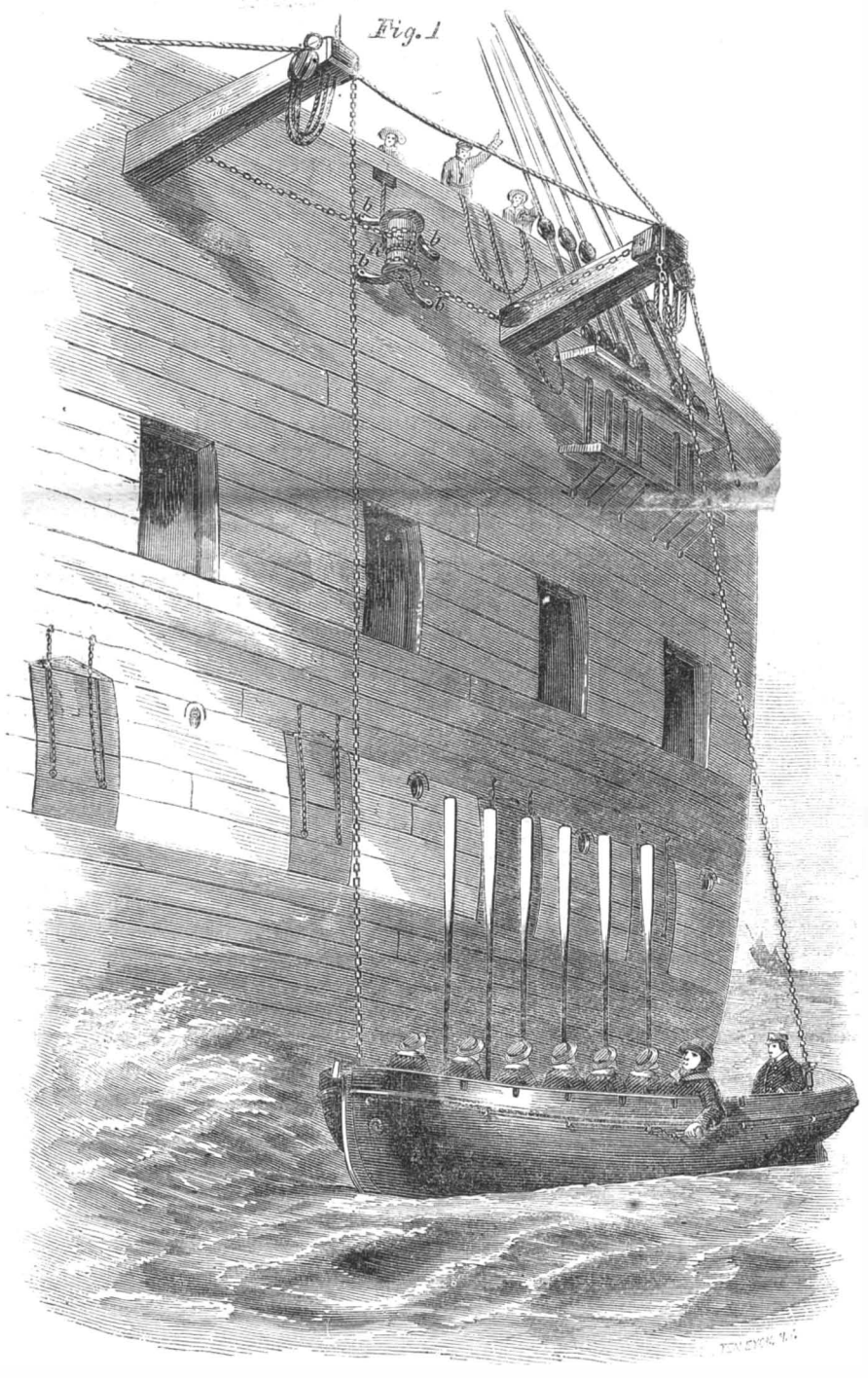

Fig. 1

DAVIDSON'S BOAT-LOWERING APPARATUS.

The detaching hooks are of wrought iron (all the joints working loosely), and are bolted to the stem and stern-post inside the boat (Fig. 2), sitting nearly perpendicular.

When the boat is at the davits, she is secured by a canvas gripe, which is capable of sustaining the whole weight of the boat, &c., and which is let go, by one effort of the hand, by the man who goes into the boat to "stand by" the tripping pin, T (Fig. 2), when the boat is to be lowered. The drawing of the tripping pin detaches both ends of the boat at the same instant. The connection between the ends of the boat and for detaching them at the same instant is, in this apparatus, entirely out of the way, where, in times of excitement, it is not liable to be fouled or difficult to keep the feet as well as the oars and material which are put in the boat out of its way when the instant comes to "let go!" In all other apparatuses that I have seen, this most important point does not seem to have been considered. The hole in the plate at *d* (Fig. 4), is for a safety pin, or an additional method of securing the boat in stormy weather, when the ship is laboring heavily, and it is wholly unsafe to lower a boat. When the safety pins are in at *d* (Fig. 4), the pin at T (Fig. 2) can be taken out, and the boat is still ready for detaching under any circumstances that a boat would live in the water; the ship going nine knots or less. And here let me remark that the idea, as expressed by some persons, that a boat can be detached no matter how fast the ship is going, is simply incorrect. Small bodies, or ordinary-sized boats, cannot be forced (even through smooth water) over a certain rate, say nine knots, with safety; for when a boat is detached, she touches the water at the speed of the ship. When boats are detached while the vessel is underway—particularly in propellers—attention should be paid to putting the helm to starboard of a port boat, and *vice versa*, so that the boat will immediately sheer off, clear of the ship.

The reel, R (Fig. 1), can be attached to the ship's side, eight inches from it, by the braces, *b b b b*, at any convenient point between the davits. In men-of-war, the reel sits on the mizzen channels, between the lanniards of the mizzen rigging. The object of having *two*

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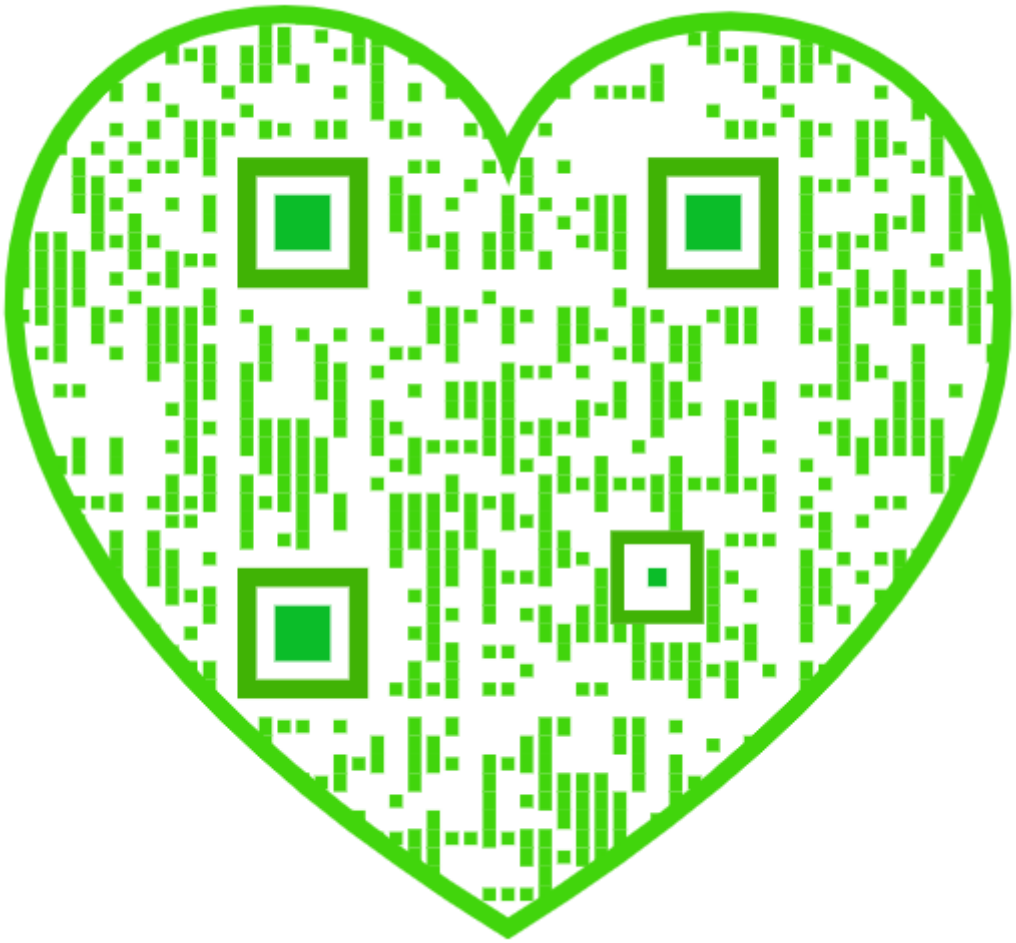


friction rollers at or near the heel of each davit, is to reduce the strain on the reel, and, consequently, on the lowering rope, so that the lowering of the boat can be easily managed by one man. After the lowering rope passes through the leader at A (Fig. 5), it can be led into the

*Fig. 2*

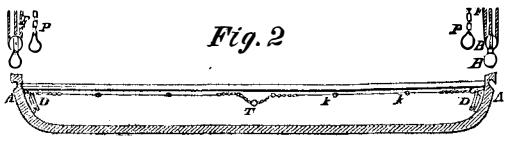


*Fig. 3*

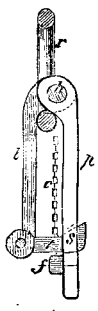


*Fig. 4*

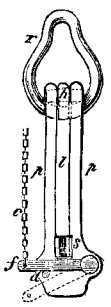
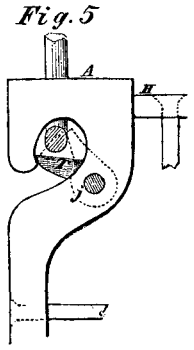


*Fig. 5*



boat, so that both the lowering and detaching can be done wholly by one man; but I consider it far preferable, from experience, that the lowering should be done from the ship, as here represented.

The Davidson Boat Apparatus was used on board the United States corvette *Dale*, on the coast of Africa, and has since successfully passed three examinations on board the United States practice ship *Plymouth*, at Annapolis, Md. Two boards of officers were ordered to examine this boat by the Honorable Secretary of the Navy; and a third, consisting of the Naval Committee of the House of Representatives, visited Annapolis for that purpose. It is now in use on board the United States steamer *Pocahontas*, in the Gulf of Mexico. The whole apparatus can be attached to any ship or any boat, and no particular kind of davit is required.

The following certificate proves the practical working of this apparatus:—

UNITED STATES STEAMER POCAHONTAS,
KEY WEST, April 7, 1860.

SIR:—I have the honor to inform you that, in obedience to your orders of the 6th and 12th of March last, I have several times, while at Norfolk and during our passage from Norfolk to this place, tested Davidson's boat apparatus for the purpose of quickly and safely lowering and hoisting boats at sea; and I have no hesitation in saying that my experiments justify me in pronouncing it to be one of the best things of the kind I have ever seen, and I recommend it for all boats in the naval service.

The quickest time I lowered the boat on board the *Pocahontas*, without any one apprehending my intention, was as follows:—

| | h. m. s. | |
|---|---|---|
| Called away the boat's crew at | 1.57.00 | P. M. |
| Commenced getting ready for lowering | 1.57.20 | " |
| Ready for lowering | 1.57.25 | " |
| Commenced lowering | 1.57.28 | " |
| Boat in water (falling two feet) and detached from her tackling | 1.57.31 | " |

At the time, we were steaming nearly seven knots per hour—sea rather rough, and weather pleasant; there were five persons in the boat, averaging, probably, 150 lbs. each, which, with the weight of the boat, oars, rudder and chair fixings, might be 1,600 lbs. When the boat was hooked on and hoisted up to the davits, the speed of the steamer was reduced to about three knots the hour. At the time, I ordered the boat's crew, called away the officers, appeared on deck and saw the performance, as well as on other occasions when it was not so quickly done, owing, probably, to the boat's crew feeling a little nervous, and carelessness in lowering the boat, but, as a general rule, I think the boat can always be manned, lowered and ready for service in one minute or one minute and-a-half, and certainly not to exceed two minutes. The boat is a light one, and now begins to leak from dropping one, two, and three feet into the water, so that a stronger boat would be more desirable if having to undergo the test of my "gig."

I trust, sir, that I have sufficiently answered the questions proposed in the copy of Mr. A. H. Evans' letter which the department forwarded to me. Respectfully, I have the honor to be your obedient servant,

S. F. HAZARD, Commander.

Hon. Isaac Toucey, Secretary of the Navy, Washington.

The patent for this invention was granted, Nov. 15, 1859; and further information in relation to it may be obtained by addressing the inventor, Lieut. Hunter Davidson, at the United States Naval Academy, Annapolis, Md.

## BONNETS.

There is a change in the fashion of bonnets! The little "apologies" which have been sliding farther and farther back on the heads of our *belles*, have finally disappeared altogether. Their place is supplied, not by a huge deformity in the opposite extreme as many people anticipated, but by a queer-shaped hat peaked-up on top of the head, looking, for all the world, as if it were astonished at the strange metamorphosis which it has undergone. What a wonderful thing is fashion! The Empress Eugénie says to herself, "Let the world of women put on a new bonnet." And forthwith, the Queen of England, the Empresses of Austria and Russia, and the Queen of Prussia (all of whom look upon the *parvenu* empress with mingled feelings of aversion, fear and contempt), bend in this matter to her authority. And not they only, but without the aid of government couriers to circulate it, heralds to proclaim it, or constables to enforce it, the silent edict is borne by steamboat, by railroad car, by stage coach, by pony express, to all parts of the earth; and all women—from the wives of our merchant-princes, who recognize no one for mistress, who are not the subjects of any, and who have never looked upon the face of a superior, to the thousands who never heard of the name of Eugènie, scattered from the north-eastern borders of Russia to the valleys among the Australian mountains—hasten to render it prompt and willing obedience.

Ladies' bonnets are very interesting things—not only to the dear creatures who wear them, or the lovers who glance under them with such bewildering anxiety, but also to the fathers and husbands who pay for the wonderful fabrics. Did it ever occur to our readers that machinery and inventions could have anything to do with these delicate, fragile, airy, and (alas!) expensive articles? It is indeed so, and this is the culminating proof that we live in an age of machinery. Considering the universal interest in the subject, perhaps some of our readers would like with us to learn how ladies hats are made. Accepting the polite invitation of the great manufacturer of bonnet frames, R. T. Wilde, we yesterday visited his establishment at the corner of Broadway and Warren-street, in this city. Mr. Wilde employs 500 girls, and sends his thousands of bonnet frames to all the markets of North and South America. He has recently patented some improvements in the details of the manufacture, which he made no boast of as a brilliant effort of inventive genius, but which, he remarked, was satisfactory in its yield of pecuniary profits. Like most of the operations of the arts at the present day, bonnet frames are fashioned with a rapidity and an economy in the expenditure of labor which astonish one who beholds it for the first time. A square piece of foundation lace, properly starched or made stiff with a suitable gum, is placed upon a copper block of the shape of a bonnet, and is, by the foot of the workman upon a treadle, pressed up into a copper mold of corresponding form, which is heated and kept at the proper temperature by an ingenious device. Being held in this hot mold for an instant, when the block is withdrawn the lace is taken off, permanently pressed in the shape for a hat. A boy then trims away the unpressed edges, and the girls sew on the wire supports. It is in this wire arrangement that Mr. Wilde has made his improvement. He uses a very small iron wire, and has it wound very thick with cotton for the edge of the bonnet, which gives him a remarkably smooth and perfectly finished edge of uniform elasticity, which does not require the usual binding. Then his wires which run inward to support this edge are very delicate and covered with silk, so that the *Star Frame*, as he has named it, not only preserves its shape perfectly, but is remarkably light and elegant. Of course it is necessary to have a copper mold not only for every change of fashion but for every variety of form required, and we observed a block of plaster-of-paris in the process of being fashioned to suit some one of the thousand caprices of the fair multitude.

The great profitableness of Mr. Wilde's patent is a striking proof of the value of an invention which makes a real improvement, however small, in any article of extensive demand in the community.

DEATH OF A BALLOONIST.—Mr. Augustus M. Connor—a pupil of Professor Wise—lost his life on the 10th inst., at Palace Garden, in this city. The balloon dashed against the glass roof of the concert-room, on which he was thrown and so injured that he died soon after.

## AMERICAN NAVAL ARCHITECTURE.

### THE STEAMER "BENJAMIN DE FORD.

This steamer was constructed by the well-known builders, Messrs. Harlan, Hollingsworth & Co., Wilmington, Del., for the Merchants and Miners' Transportation Company, to run between the ports of Baltimore and Providence, *via* Norfolk, Va. As this vessel is claimed to be one of the best of its kind ever erected by those builders, we are of the opinion that the essential elements of its construction will be interesting to the readers of the SCIENTIFIC AMERICAN, and so proceed to give them in detail as follows:—Length on deck from fore-part of stem to after-part of stern post, above the spar deck, 213 feet 6 inches; breadth of beam at midship section, above the main wales (molded) 33 feet; depth of hold 15 feet 6 inches, depth of hold to spar deck, 23 feet 5 inches; draft of water at load line, 12 feet 6 inches; tunnage, 1,090 tuns.

Her hull is of wrought iron plates, 7-16ths and 13-16ths of an inch in thickness, and very securely fastened with rivets $\frac{7}{8}$, $\frac{3}{4}$ and $\frac{5}{8}$ of an inch in diameter, every 3, $2\frac{1}{2}$ and 2 inches. Distance of frames apart at centers, 16 and 17 inches. There are 12 fore and aft vertical keelsons, 20 inches in hight, continuing the whole length unbroken, all tapped off with angle iron, and the four center ones are boxed in, and are 9-16ths of an inch in thickness, the remainder are $\frac{1}{2}$ of an inch thick; four of these are situated under the engine, and are 4 feet in hight. The floors are shaped I (vertical); 20 inches in length, $\frac{1}{2}$ an inch in thickness; there are 14 cross floors of this hight and thickness, which continue up to lodger and clamp at the guard deck, forming belts and knees, joined to fore-and-aft keelsons with angle iron, capped the entire distance with same, and those under the shaft are boxed in. The shape of her keel is U, 7 inches deep and 13-16ths of an inch in thickness.

The *Benjamin De Ford* is fitted with one vertical beam condensing engine; diameter of cylinder, 56 inches; length of stroke of piston, 11 feet; diameter of paddle wheels, 30 feet; material of same, iron; number of blades, 26; width, 7 feet 6 inches; and their average depth is 1 foot 7 inches.

She is also supplied with one return tubular boiler, whose length is 16 feet; width 16 feet 7 inches, and 12 feet 8 inches in hight; location in hold; number of furnaces, 4; length of grate-bars, 7 feet 6 inches; number of arches, 4; number of tubes, 212; diameter of arches, 21 inches; diameter of tubes, 4 inches. The hight of smoke pipe, above grate surface, is 55 feet; its diameter is 63 inches; area of heating surface of boiler, 3,220 square feet.

The weight of her engine is 280,000 pounds; weight of boiler with water, 139,000 pounds; capacity of coal bunkers, 140 tuns. The boiler has a water bottom; and no blowers to furnace. The maximum pressure of steam is 25 pounds, cut off at $\frac{1}{2}$ stroke, and number of revolutions at this pressure, 20.

Her rig is that of a brigantine. She has three watertight athwartship bulk-heads. The bunkers are of iron; her water-ways of wood, and she possesses one independent (extra size) steam fire and bilge pump, one bilge injection, and the ordinary bottom valves to all openings in her bottoms. In addition to these features she is amply protected from communicating fire by felt, iron, tin, &c.

GOLD INK.—Take some leaf gold and white honey and grind them together upon a marble slab until the gold is reduced to an impalpable powder. The paste now formed is agitated in a large glass tumbler with soft water, which dissolves the honey while the gold falls down to the bottom. The water is now poured off and the gold washed until all the honey is removed, after which the gold is dried and then suspended in a mucilage of gum arabic. It is now used for writing upon paper, and when it becomes dry it may be burnished and rendered brilliant. Silver ink is prepared in the same manner, by substituting silver leaf for the gold. Gold is also obtained in powder by dissolving nitro-hydrochloric acid (*aqua regia*), which is called the terchloride of gold. When crystallized, this is soluble in water, alcohol and ether, and may be used for gold ink by adding a gum mucilage to the water or alcohol in which it is dissolved. Metallic writing fluids of different colors can be made by mixing bronze powders in gum mucilage.

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## ON THE PRE-HISTORICAL EXISTENCE OF MAN.

Of all the subjects which have occupied the attention of the scientific societies and journals of Europe during the past year, none have excited so much interest as the geological evidence lately adduced from various sources, tending to prove that the period of man's existence upon our planet has been vastly greater than that hitherto assigned by Biblical and common chronology. It is also a very noticeable circumstance that, notwithstanding this subject has occupied the attention of the scientific men, generally, of Europe, during the past year, to a greater extent than any other, it has been scarcely noticed in any American publication, with the exception of the "Annual of Scientific Discovery," and from the pages of this work for 1859 and 1860, we obtain the following *resumé*:—

Some two years ago or more, Mr. Leonard Horner, an English engineer of wealth, and a member of the Royal Society, undertook, in connection with some French engineers in the employ of the Pasha of Egypt, to determine the depth of the alluvial deposits in the valley of the Nile. This river, as is well-known, is remarkable for its annual overflow, whereby a great part of all the arable land of Egypt is submerged for the period of several weeks, and covered with a thin deposit of mud or sediment, which in geological language is termed *alluvium*. This action recurring with great regularity, year after year, has produced on both sides of the Nile a strip of land of unexampled fertility, and is also yearly extending the delta or coast-line, at the mouth of the river, further into the Mediterranean. In all places in the valley of the Nile where the soil has remained undisturbed by human agency, the annual deposits of mud can be seen reposing npon each other with great regularity—each successive layer orstratum of sediment representing a year in time, in the same manner as the successive rings in the trunk of a tree represent the wood-growth of successive seasons. By counting, therefore, the number of layers in a given thickness of Nile deposit, we have an almost certain measure of the time required for its formation.

Mr. Horner's researches were based upon these facts, and were made by sinking a series of shafts, ninety-five in all, across the Nile valley, nearly in a line with, and crossing the site of, the ancient city of Heliopolis. In every case the alluvium was found to be regularly divided into layers, and the average of many careful measurements, indicated that the rate of vertical increase of sediment was about three and one half inches per century. One of these shafts, in particular, was sunk close to the great monolithic statue of Rameses II., at Memphis, and it was found that there were nine feet four inches of Nile sediment between eight inches below the present surface of the ground and the lowest part of the platform on which the statue stands. Now this statue has been determined by Lepsius and other Egyptian scholars to have been erected 1361 years before Christ, and this date, added to 1858, gives therefore 3218 years, during which the above-mentioned depth of sediment accumulated; a rate of increase in strict accordance with the results of the measurements above alluded to. Below the platform of stone on which the statue rests, the shaft was driven thirty-two feet; but the lowest two feet consisted of sand, thus leaving thirty feet of true Nile sediment in an undisturbed condition below this foundation. At the base of this sediment, or at a depth of thirty-nine feet four inches from the present surface of the ground, fragments of pottery were found in a good state of preservation, and exhibiting some considerable artistic skill. Allowing, now, that the thirty feet of sediment covering these remains (below the platform of the statue) were deposited at the rate of three and one half inches per century, we have in the fragments of pottery a record of the existence of man 13,500 years before A. D. 1858, 11,500 years before the Christian era, and 7,600 years before the commencement of the reign of Menes as assigned by Lepsius; of man, moreover, in a state of civilization sufficiently advanced to be able to fashion clay into vessels, and harden it by heat.

The fragments in question are now deposited in the British Museum, and Mr. Horner in exhibiting them to the Royal Society, expressed a confident opinion that their antiquity was at least equal to the calculation above given. At any rate, it seems certain that they were deposited in the place from whence they were taken, long anterior to the time when the workmen of Rameses II. laid the platform for the reception of his statue, 3,000 years ago.

The results of Mr. Horner's investigations are, however, cast entirely in the shade by the discovery of flint weapons, spear heads, axes, &c., associated with the remains of extinct animals—elephant, rhinoceros, bear, tiger, hyena, &c.—in undisturbed beds of gravel, in the north of France. The announcement of this discovery was first made by Mr. Evans, an English geologist, to the London Society of Antiquaries, in June, 1859, and subsequent researches have fully confirmed it. The weapons and bones occur in what is geologically known as the *drift*, in the neighborhood of the town of Amiens, and present unmistakeable evidence of having been buried cotemporaneously. At the meeting of the British Association in September, 1859, Sir Charles Lyell, who has hitherto favored the received chronology respecting man's existence as a race, said that he fully believed that the antiquity of these flint weapons was immensely great as compared with the times of either history or tradition; and it is conceded by all geologists that the continued existence of tropical animals is not possible in Central Europe, under the present conditions of climate. The conclusion, therefore, seems unavoidable, that there were races of men inhabiting Europe at a period when its temperature was altogether different from what it now is, and when the country was the natural habitation of species of animals now restricted to the tropics. Our space does not allow us to enter at greater length into the examination of this subject, and for further information we must refer our readers to the volumes above noticed, and to the speech of Sir Charles Lyell before the British Association, which is there reported.

## SCIENCE AIDING JUSTICE.

The facts embodied in the following narration, in connection with a recent murder trial, show the value of scientific acquirements and are of exceeding interest to a large class of our readers:—

A traveler was found dead in his bed, one morning, at a country tavern. His throat was cut at the side, the instrument having pierced the carotid artery; the victim had been for some time wasting away by disease. The landlord was one of the most influential and highly-esteemed persons in the neighborhood, was extensively and well connected, and had a large and interesting family. Having been seen very late at night passing through the hall into which the traveler's door opened, the suspicions of certain persons were aroused; and upon being taken into custody, a penknife was found in his pocket, with apparent blood stains on the large blade, and something similar on the ivory handle. The knife was placed in the hands of an expert physiological chemist, for examination. The stain was found to be of blood and not of iron rust or paint, as it contained albumen and animal fiber. The blood on the ivory handle contained a large amount of iron, that on the blade, comparatively little. As human blood contains ten times as much iron as that of animals, it seemed certain that the knife in question could not have entered a human body; still there was a doubt, because in slow diseases there is a great deficit of iron in the blood, which deficit is a not unfrequent cause of death.

But as the blood on the ivory handle had the full amount of iron for a man in vigorous health, it seemed to show that there were two different kinds of blood, one human certainly, the other possibly so. Hence another mode of inquiry was proposed. The blood of animals and men crystallizes, but in different forms—that of man represented by a perfect square lengthened cube, called prismatic; that of animals, by the cube, tetrahedal, or several-sided hexagonal. This analysis entirely removed the doubts connected with the proceeding, for it demonstrated that the blood on the blade was that of a lower animal, and that on the handle was certainly human.

A third line of investigation was pursued. All the inner surfaces of the human body are covered with a glairy-looking fluid called "mucus," which is differently constituted, according to the part of the body from which it is taken. As observed through a microscope, that which is found about the upper part of the throat presents the appearance of a pavement of bricks or square pieces, hence it is called "tesselated." The mucus from some other parts is conical, looking like a pavement made of round pieces, flattened. A third kind, coming from the intestines, seems hairy, cilliated, waving as the tops of long grass under the influence of the wind. Examining the blood on the handle, which was now known to be that of a human being, it was found not to present the pavement-like appearance, but it did clearly show the wavy lines; it could not, therefore, have come from the throat, and as the traveler had no wound except that on the throat, and as the blood on the blade was clearly animal blood and not human, no part of the blood on the knife could have been that of the unfortunate traveler, and therefore the landlord was discharged, when he gave the following statement:—

Some days before, while out hunting, he killed several squirrels, and stooped to cut a switch with a knob at the root, on which to string his game; the knife slipped as he cut upwards, and it penetrated the abdomen. In his haste he wiped the knife clean with some leaves, closed the blade, and in attempting to put it into his pocket, it fell on the ground; he picked it up and directed his steps homeward. In a few minutes one of the squirrels slipped off; he pierced it through with his knife, strung it on the switch, and had not used the knife since. This was plausible, and he showed the wound, not yet entirely healed; but this could easily have been made to answer an object. The physiologist therefore proposed as a mere matter of curious interest, to examine the blood on the blade and also that on the handle. That on the handle was wavy, cilliary, with the largest amount of iron, showing that it must have been from a man of robust health, and the mucus from the abdomen is always cilliary and never tesselated. Again, the blood adhering to a knife penetrating a living body coagulates—that entering a body already dead never does. The blood on the blade, already shown to be that of a mere animal, was now found to be incoagulable. Hence, that on the blade was shown to be the blood of a mere animal already dead; that on the handle was the blood of a man in vigorous health, and could not have come from the throat, and almost certainly came from the abdomen. When the knife fell on the ground, the handle touched some of the leaves with which it had just been wiped. Thus the chain of evidence for the landlord's innocence was unbroken and perfect. The real culprit was subsequently found, tried and executed, confessing his guilt.

It is certain that, in the progressive march of science and art, the unchangeable laws of nature will be better understood—correcting the errors and fallacies of human judgment; and the testimony of Science will thus aid Justice in forming her opinions and enabling her to give her decisions *with her eyes open!*

THE STILL-ROOM MAID.—Time was, when in the still-room "distilled waters" and "cordials" were drawn and dispensed as specifics for maladies to guests and dependents; but now this practice is out of use, because they can be purchased cheaper than they can be made at home; nevertheless, the still-room maid preserves her name, though rarely required to perform her ancient duties. To expect the revival of this part of domestic economy would be absurd, yet we must say that a domestic laboratory attached to the conservatory would be highly instructive and amusing. To those, even, who have no conservatory, we would yet advise to set a room apart in their mansions, with the title of "laboratory," or the ancient one of "still-room." Here experiments may be made, scents distilled, and an acquaintance courted with "common things" without interfering with other people of the establishment or "making a mess about the house." The amount of instruction that can be derived from a private laboratory is far more than at first sight can be conceived, and the entertainment, changeable as a kaleidoscope, is (intellectually considered) immeasurably superior either to crochet or Berlin work. The delicate manipulations of chemical experiments are well, even better, suited to their physical powers than to the sterner sex; and to the ladies, therefore, we commend the charge of becoming the *chefs* of the modern still-room.—*Piesse's Art of Perfumery.*

TRAINING BEANS.—Lima beans may be gathered at least two weeks earlier if trained on lateral poles, instead of the upright ones generally used. A correspondent of the *Gardener's Monthly* states that he ties on lateral slender rods to the upright poles, and trains the vines to them. In this way he has beans much earlier than when the vine is allowed to run upon upright poles.

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## THE JAPANESE EMBASSY.

The United States steam frigate *Roanoke*, 44 guns, Captain Wm. H. Gardner, commanding, bearing the flag of Flag Officer, William J. McCluney, Commander in-Chief of the Home and Gulf Squadron, having on board the Japanese Embassy, arrived at the entrance to our harbor on Wednesday evening, May 9th. Dispatches from the Secretary of the Navy were immediately taken on board, ordering the flag officer not to enter this port, but to return at once to Hampton Roads, Va., in order that the strange guests of the nation, who have come so far to make us a visit at our invitation, may be received first at the Capitol, before they take their view of the commercial metropolis.

Two years ago, at a great fire in Japan, the English copy of the treaty between this country and the empire was burned, and Consul Harris, who has shown such remarkable ability in dealing with these people, had the address to induce the government to send an embassy to this country to get a new copy signed by the President. Two ambassadors were accordingly appointed, attended by 18 subordinate officers, and 52 servants, making 72 persons in all. One of these was taken ill at San Francisco, and sent on board the *Candinmarruh*, the Japanese man-of-war which had preceded the embassy to that port.

The first ambassador is Prince of Bujen, and Chamberlain to the Tycoon—one of the highest officers of the government. He is small, delicate, olive complexion, and rather good-looking—something of the Hebrew type. He is 41 years old. He dresses in a sort of loose dressing-gown, talma, *pijama*, and white gaiters. His under-dress is of white silk and linen, which comes up around the neck, instead of collar and necktie.

The Japanese wear a great variety of colors—a custom among the servants as well as the upper classes—the favorite color seems to be sky-blue. The gown generally worn is a sort of slate color or purple., the talma of sky-blue, and the pijama of crape silk of the most beautiful figure and texture. The shape of the pijama is a sort of loose trowsers, fastened round the waist by a silk cord and tassel, which hangs down by the side like that of a sword belt. The back part is drawn over a flat hoop or thin board, about two inches wide that fits close round the small of the back. The sides on the hip are scolloped out, showing the gown down as far as the knee. This dress is not worn by servants. The style of wearing the hair is the same with all classes. The front part of the head is shaved, the hair which is quite long, is combed from the side and back part of the head, upon the part shaved, and tied up in a knot. The hair is jet black, very stiff and glossy, made so by "obe oil" and other ingredients which they use.

His Excellency wears white cotton gaiters, which are only worn by princes and those of high rank; the lower classes are not allowed to wear them. He wears two swords, but no jewelry, and usually carries a fan; hats are seldom worn. They make beautiful *papier machè* hats, but they seldom wear them. Upon the sleeves, back and breast of the talma are round white marks, about the size of a dollar, which indicate their rank, and are used in signing their name instead of writing it. They are family or master's marks; when of the former, they are only worn by the eldest son.

Though their traveling expenses are all borne by our government, they bring $80,000 in coin for purchases. Their baggage amounts to 80 tuns; and in crossing the Panama Railroad it filled four cars. Some of their more valuable baggage—such as the "treaty box," containing the treaty—was taken along with the Commissioners. They never allow it out of their sight. One of the official's special duty is to look after the treaty box. It is about three feet long, two feet in depth, and eighteen inches wide. This is covered with red morocco leather, handsomely stitched about the edges. The box is enclosed in a light frame, made of slats about two inches wide and half an inch thick, resembling very much the frame about Herring's safes. This box is carried by two poles, about ten feet long borne on the shoulders of four men. There are, in fact, three boxes which form the one covered by leather. One box contains the letter from the Emperor (or Tycoon), to the President; one, the Japanese treaty in their own language; the other a copy of the treaty in English, which they bring to have signed by the President.

When the cars started from the depot at Panama they showed not the least surprise, as they never do on any occasion; but expressed their delight by jumping up, laughing, talking, clapping their hands, smoking and all kinds of gestures. At the halfway station whilst the train was stopping, the Japanese were out making sketches of the locomotive, cars, station-house, birds, trees, plants, flowers, and almost everything the saw. There are some dozen or more artists, some who take drawings of animals, birds, &c.; some landscape sketches, &c., each having a distinct and separate department assigned him. The rapidity and correctness with which the sketch would astonish even a Yankee.

They have articles of their own manufacture of every description, some of which will astonish our people when they see them. They have a beautiful specimen of Sharp's rifle (one of their own manufacture) and one of those presented by Commodore Perry, made by Sharp himself. The one made by the Japanese is a decided improvement upon the original, as pronounced by all who have seen. The improvement consists in cocking, priming and cutting-off the cartridges at the same time. The original does not cock on putting down the guard, which cuts off the cartridges but has to be cocked by the thumb. The Japanese rifle can be cocked or not on cutting-off the cartridge, according to will. The barrel is beautifully rifled, and is a fac-simile of the original. The workmanship and finish are equal, if not superior, to the original Sharp, or any other fire-arm ever seen.

They have a large quantity of beautiful silks, brocatels, linen, crape, silk, pongees, poplins, &c., of every conceivable style and pattern. It would require an experienced dry-goods clerk to give the proper names to hundreds of articles which they have in the dry-goods line.

It is not likely that they will visit any other city but New York, as their time for returning is limited to the 1st of October. Their great desire appears to be to visit "Ni York," Washington and *America*. Everything is either "America" or "Ni York."

It will be well worth a short journey from the country to this city to witness their reception here when it occurs.

Japan is supposed to contain as many inhabitants as the United States. It consists of three principal islands, and about 3,500 small ones, which lie off the eastern coast of Asia, from latitude 26° to 52°, extending from the latitude of Florida to that of Labrador. The Japanese enjoy an old and complicated, but not very high civilization. Some of their mercantile establishments are of immense extent. A man may buy a piece of dry-goods, and if, on taking it home a thousand miles from the place of purchase, he is not satisfied with it, he may take it into a branch establishment of the concern of which he purchased, and receive his money back, delivering up the cloth. Their religion forbids them to eat any meat or even milk, butter or cheese. One of their most singular customs is that of suicide, which, under many circumstances, is inexorably demanded by public opinion. It is always affected by ripping-up the bowels, and is called the *harri-karri*, or "happy passage." The exclusion of foreigners from Japan is a comparatively modern measure, having been adopted in the early part of the 17th century (just about the time of the settlement of this country) from jealousy on the part of the government towards the Portuguese and other Christian missionaries.

## THE WORK AND POWER OF STEAM ENGINES.

The following is a definition of *work* and *power*, as applied to steam engines, written by S. Holland, formerly Chief-engineer in the Royal Navy, and recently published in the London *Mechanics' Magazine*:—

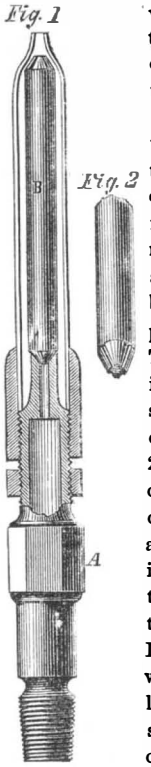
*Work* is a term in mechanics, of recent origin but of great utility; it means a compound of force (or pressure) and motion. Work is said to be performed when a pressure is exerted upon a body and the body is thereby moved through space. The unit of pressure is one pound; the unit of space, one foot; and work is measured by a "foot-pound" as a unit. Thus, if a pressure of so many pounds be exerted through a space of so many feet, the number of pounds is multiplied into the number of feet and the product is the number of foot-pounds of work; hence if the stroke of a steam engine be 7 feet, and the pressure on each square inch of the piston be 22 pounds, the work done at each single stroke for each square inch of the piston, will be $7 \times 22 = 154$ foot-pounds.

*Power* contains another element in addition to those contained in work. It implies the ability to do so much work *in a certain period of time*; and in order to have a proper idea of it a unit of measure is also employed. This unit is called a "horse-power," and is equal to 33,000 pounds raised through a space of one foot in one minute; it is the execution of 33,000 foot-pounds of work in one minute. To find the horse-power of a steam engine is to find the number of pounds pressure on the piston in square inches, and to multiply this by the number of feet traveled by the piston per minute, which gives the work; then this is divided by 33,000 and the quotient is the horse-power, which is usually abbreviated H.P. As pressure is always indicated by the square inch, the number of square inches in the area of the piston has to be found. This is done by squaring the diameter of the piston and multiplying this by the decimal .7854. The following is the horse-power of the engines of the British war steamer, *Sphynx*:—Diameter of piston, 82.5; stroke, 6 feet; revolutions, 16½ per minute; mean pressure on each square inch of piston, 16.35 lbs. Now, $82.5_2 \times .7854 \times 2$ (number of pistons) $\times 16.35 \times 198$ (velocity of piston in feet per minute) $\div 33{,}000 = 1048.8$ H.P. This is the nominal power. The work done by the pistons of these two engines per minute is 34,610,807.88 foot-pounds, which, when divided by 33,000 lbs. gives 1048.8 horse-power.

## SAULT'S AIR TRAP.

Steam pipes, for heating buildings and apartments, are very apt to become filled with air, as well as water, which obstructs the circulation of the steam and, consequently, the operation of heating. In dwellings, the proper remedy for this is to make a small opening in the upper portion of the pipes, as the escape of a small portion of steam with the air is conducive to the health of the occupants. But in manufactories this waste of steam is to be avoided, and in some situations it is desirable to have the air as dry as possible. For such places the neat little apparatus represented in the annexed cut has been invented.

It consists of a valve box, A, to be screwed into the upper portion of the pipes with a valve, B, made of hard vulcanized india-rubber, so fashioned that when the valve expands it will close the opening, and when it contracts the air will be allowed to escape from the pipes. It is the nature of hard vulcanized rubber to expand and contract very much with changes of temperature, and this property is here made available. The valve box, A, is made of cast iron, brass or other suitable material, with its interior chamber communicating with the steam pipes and opening to the external air. The valve, B, is made of hard vulcanized india-rubber with its ends fitted to seats in the valve box; grooves being cut in its upper end, as shown in Fig. 2. When the fire is out, the steam condensed, and the pipes filled with cool air, the valve, B, is contracted, and as the steam begins to be generated it drives the air before it, which lifts the valve from its lower seat and escapes through the grooves in its upper end. But when the hot steam reaches the valve, the latter is expanded and its lower end is pressed down into its seat so that no steam can escape. The valve chamber is made in a piece separate from the lower valve seat, so that the play of the valve, when cold, may be adjusted by screwing the one part a greater or less distance upon the other.




Radiators of some forms are liable to collapse from the vacuum formed in them by the condensation of the steam when they cool, and provision has to be made for the admission of air as the steam condenses. This trap is a convenient apparatus for this purpose. Of course, for such use, the position of the valve must be reversed, with the grooved end downward.

The patent was procured, through the Scientific American Patent Agency Feb. 28, 1860, and any further information in relation to it may be obtained by addressing the inventor, Thomas Sault, at Seymour, Conn.

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## A METEORIC MYSTERY.

MESSRS. EDITORS:—On April 21st, our town and vicinity was visited with the most extraordinary meteoric phenomenon ever known in this country. About half past 12 o'clock a loud report, resembling the report of a cannon, was heard, apparently at the northwest corner of the town. This produced much astonishment, as we have no cannon in our town; and just as everybody was ready to ask what caused the report, another burst upon the ear, directly over the town, as it appeared to us. This report was followed by eight or ten more, in quick succession, resembling the loud beating of a bass drum. After these reports a singular rumbling, whizzing noise followed for about two minutes. The greatest consternation was created. People ran into the streets, horses took fright, and cattle and sheep in the fields ran to and fro with wild excitement. The earth seemed to tremble, and the concussions were felt sensibly in many houses. Soon after the explosions, I was told by several persons that many large and peculiar stones had been found scattered all over the town. Men working in the fields saw dark balls flying in different directions and alighting upon the earth, shaking it considerably for several hundred feet around. On proceeding to the several spots, they found large stones imbedded two or three feet in the earth, and *very hot!* Several of these stones have been taken out and brought to town, weighing (seven of them respectively) 30, 36, 40, 42, 51, 53, 53½. The stones are different from any in this country. The outside is black—being burnt to that color, but when broken the body appears a species of sandstone, of a bluish cast, and is supposed to contain a large quantity of iron. They are very heavy for their size, and all have the same appearance. The nearest one was found one-half a mile, and the farthest off about four miles from town. It is supposed that many more will be found, and searching parties of citizens and strangers (who have come here for the purpose) are out during the day "looking-up" the wonderful stones. At the time of this singular occurrence, the sky was clear; the only large cloud visible was whirled about unceremoniously by the rushing mass of *rack* proceeding from the northwest to the southeast. The shock was felt and the report heard within a radius of about 20 miles from this place, in different directions; but the stones seem to have fallen but short distances southeast of our town. No very small pieces of stone have yet been found—the smallest weighing about 30 pounds. The phenomenon has created much excitement, and at the time of its occurrence, many persons (especially the superstitious) supposed that the "end of all things earthly" was at hand. It was, to say the least of it, a wonderful event. I leave speculations (as to its cause) to the consideration of your scientific readers. W. D. S.

New Concord, Ohio, May 7, 1860.

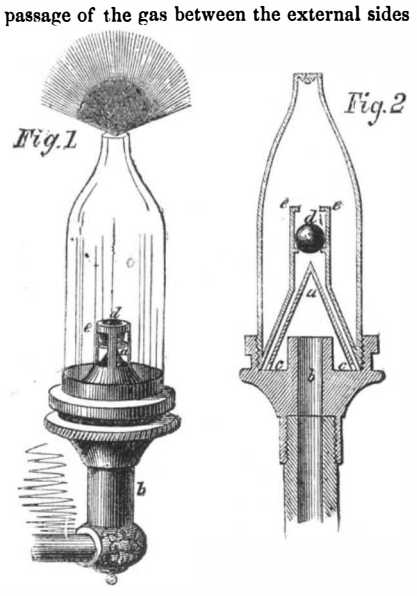
[We are indebted to Rev. W. D. Siegfried, of Concord, Ohio, for the above account, which is confirmed by a letter from Mr. James McDonald, of the same town. It relates simply to one of those showers of meteors which are frequently falling on the earth, very full accounts of which will be found on pages 354, 369, 379, 383, and 398, Vol. I. (new series) of the SCIENTIFIC AMERICAN. The phenomenon now described, however, is a remarkable and interesting one. A petition was lately presented to Congress by C. T. Jackson, John Bacon, B. S. Shaw and J. Wyman, of the Boston Society of Natural History, requesting authority and the necessary appliances to be given to Dr. John Evans, United States Geological Surveyor of Washington Territory, to remove (to Washington, D. C.) a meteorite discovered by him on a mountain in Oregon. They state that it is a mass of meteoric iron, containing chrysolites, nickel, tin and other ingredients belonging to meteorites. It is about 5 feet in diameter above the soil. The petition says:—"No discovery in the mineral kingdom will give so high a celebrity to Oregon, as that of so remarkable a meteorite as this, and a knowledge of it, when placed where it can be examined by scientific men will be spread over the world." It also says that, in Europe, "dealers in objects of science demand in exchange for such specimens their weight in gold, and some rare specimens cannot be obtained for even that price."—EDS.

ONE of Messrs. Burns & McIver's (the leading stockholders of the Cunard line) new steamships—the *Atlas*—has all her iron-work, even to her tanks, galvanized (coated) with zinc.

## THOMPSON'S REGULATING GAS-BURNER.

Persons who burn illuminating gas are aware that the flow of gas, and consequently the size of the flame, are varied by the varying pressure in the pipes, requiring not unfrequent attention to the stopcock which regulates the discharge from the jet. The annexed cut represents an apparatus to be introduced into the burner to render the flow of the gas nearly constant under the varying pressures in the pipes.

It consists of a hollow cone-shaped cup or valve, *a*, placed over the end of the gas-pipe, *b*, with small notches in its lower edge for the passage of the gas, and in the ball, *d*, placed in a tube above the valve. When the pressure of the gas becomes so great as to overcome the weight of the valve, *a*, this valve is lifted till its apex comes in contact with the ball, *d*, thus partially closing the passage of the gas between the external sides of the




valve and the interior sides of the chamber in which it is confined. Should the pressure of the gas continue to increase so as to overmatch the combined weight of the valve and ball, a further rise takes place, diminishing still more the passage way of the gas, and thus causing about the same quantity to flow under the increased pressure as escaped through the larger opening with the lower pressure.

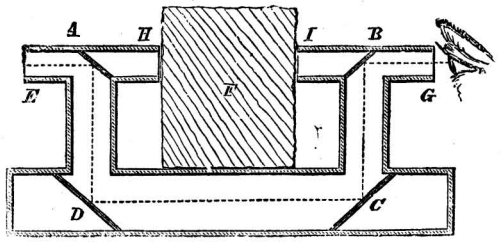
It is evident that the pressure may be regulated by a spring instead of the weights of the valve and ball. In either case the stops, *e e*, or their equivalents, must be provided to prevent the entire closing of the valve, and the weight or spring must be properly adjusted to the pressure of the gas.

We are told that this simple regulator is declared to be of great value by officers of gas companies, and that it promised to come into general use.

The patent for this invention was procured, through the Scientific American Patent Agency, May 1, 1860, and further information in relation to it may be obtained by addressing the inventor, George W. Thompson, at No. 7 St Mark's Place (Eighth-street) this city. [See advertisement in another column.]

## HOW TO SEE THROUGH A BRICK WALL!

Our juvenile readers will derive both instruction and amusement, if we tell them how to *apparently* perform the astonishing feat mentioned above. It is done in the following way:—Construct a box, like the figure shown in section below. A, B, C, D, are four small pieces




of looking-glass, all placed at an angle of 45°, with respect to those sides of the box in which they are fixed. At E, G, two flat pieces of common glass are inserted, and at H, I, there are two similar pieces; the latter pair, however, are only used to complete the illusion, for they have no communication with the interior of the instrument. Of course the arrangement of the four inclined glasses is concealed by the sides of the box. Now, supposing you look through the opening G, in the direction of an object placed at E, you will see it in thes ame manner as if there was an uninterrupted view between E, G, which is evidently not the fact.

The cause of the above-described illusion is readily explained. The image of the object at E is received on the looking-glass at A, by which it is reflected to D, as it is again from D to C, and afterwards to B; and this last image is seen by the eye of the spectator placed at G, in the same position as if he was looking at the real object itself at the extremity of a horizontal line. Hence, it is evident that the placing of a solid block of wood, F, or a brick, or any other opaque body, between the glasses, H, I, will not prevent the object from being seen. Now, place the apparatus in the hands of a companion, that he may look through either of the glasses G, E (it matters not which), at any object placed at the opposite extremity of the upper part of the box. You may then safely assert that your instrument is of so "magical" a nature that it will enable you *to see through a brick wall;* but that, as a single brick will be more convenient, and equally wonderful, you are willing to prove your assertion at once. A block of wood, a hand, a hat or any other opaque object is, of course, just as eligible to illustrate the phenomenon.

It is evident that a similar series of glasses might be so arranged as to enable a person standing near the wall of a room, G, to see what was being done in an adjoining room, E, separated by a brick wall, F, or even by a third room intervening; and if the above engraving be so viewed as to bring the part E or G uppermost, the easy application of this principle to an upper and lower apartment will be equally obvious.

## PHILOSOPHY IN AN EGGSHELL.

MESSRS. EDITORS:—A correspondent recently asked you the reason why sugar strikes fire when two lumps are struck together after the fashion of flint and steel. In like manner, I would ask the reason why a good egg, when brought to the edge of one's tongue, feels cold at the *tip* and warm at the butt end? This is a wonderful fact; and there is doubtless a deep philosophy in the phenomenon. It is clear enough that a good egg has the germ of a fowl in it, and hence a vital spark; but why it is cold at the point end and warm at the blunt end, is not so evident. The Chinese have a notion that there is in nature a principle (which they call *taki*) combining in itself both a male and a female; and that this principle is constantly at work to produce one or the other of the sexes, agreeably to the constituent matter in which it floats. This *taki* has two poles—the same upon which Mesmer founded his theory of "animal magnetism." Has this anything to do with the warmth and cold of the egg? The Chinese physician says we must understand the condition of this principle in the patient before we can apply the proper remedy for his cure; for, according as the male or female predominates in the patient, so must be the application of the remedy. In sickness, it often happens that one extremity of the body is cold while the other is hot. But, with all this philosophy, I would ask, why is this wonderful difference of temperature between the two ends of a good egg?

As to the fire flying out of sugar, when lumps of it are struck together, let me say that this phenomenon is most remarkable with rock-candy. When rock-candy is crushed between the teeth, in a dark corner, it exhibits the appearance of eating livid coals! When two lumps are struck together, as boys often strike flint stones, the same phenomenon is produced. Percussion causes decomposition of the finer particles in the act of abrasion. Wood does the same thing when abraded. All matter contains latent heat; and where there is heat, *fire* is near by. Even our heads scintillate whisps of fire when we accidentally, or otherwise, percuss them. How beautiful and how wonderful are the works of nature!

JOHN WISE.

Lancaster, Pa., May 10, 1860.

A BILL has passed the California legislature, which creates the office of a State Geologist, and another, granting $60,000 and $40,000, in installments of $6,000 and $4,000 per annum, to the first and second companies that will establish telegraph lines across the continent. About 7,000 persons have gone to the Washoe silver mines, and the rush still continues. New silver veins of great richness are reported to have been discovered. $5,000 have been appropriated for sinking wells on the Colorado desert.

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## OUR WESTERN CORRESPONDENCE.

CHICAGO—ITS WATER-WORKS—A "RISING" CITY—RAILROAD RADII—STREET LINES—A PECULIAR PAVEMENT—MARKETS AND MANUFACTURES—DIRECT TRADE WITH EUROPE, ETC.

MESSRS. EDITORS:—This is one of the most active, enterprising and progressive cities on our continent. It is favorably situated for commerce, as it has water communication with the Atlantic ocean during summer by the lakes, rivers and canals throughout Canada and New York; and behind it—stretching to the South, West and North—is the great valley of the Mississippi, with which it has communication by railroads. The city extends along the shores of Lake Michigan for several miles; a river runs through it, on the banks of which are docks extending for seven miles. This river is about 200 feet wide, runs up for about half a mile, then divides into two branches—northern and southern. In 1836 this city was composed of a few huts; in 1854, its population was 70,000; to-day it is 125,000.

The water-supply of this city, for domestic and manufacturing uses, is obtained from the lake, and is pumped up to an elevation by two great Cornish engines. The length of water pipes is 85 miles; the three water reservoirs contain 3,000 tuns each.

Of recent years Chicago has been elevating itself upon an extensive scale. It is not uncommon in other cities to raise single houses several feet by the use of jack-screws; but the Chicago-ites do this upon the wholesale principle. An entire block of 13 stores (including the Marine Bank) has just been raised five feet. The entire weight lifted was over 30,000 tuns; and 600 men were employed for five weeks in the operation.

Chicago is well furnished with railroad communication; no less than 11 lines radiating from it. These are, 1st, the Milwaukie, which runs north; 2d, the North Western, which runs northwest to Wisconsin; 3d, the Galena and Dubuque; 4th, the Chicago, Burlington and Quincy (Illinois); 5th, the Rock Island, which goes to Iowa; 6th, the Chicago, Alton and St. Louis; 7th, the Illinois Central, the present length of which is 700 miles (the longest in the United States; it terminates at Cairo, the southern end of the State, and the corporation still owns 1,000,000 acres of land); 8th, the Michigan, Southern and Northern Indiana, which is 244 miles to Toledo; 9th, the New Albany and Salem, which communicates by way of Cincinnati; 10th, the Michigan Central Railroad, which goes to Detroit, is 283 miles long, and is very complete in every respect; 11th, the Pittsburgh, Fort Wayne and Chicago line, which is 467 miles long. Those railroads which pass through Wisconsin and Iowa are doing a large western trade with Chicago.

The locomotive-house and machine-shop of the Central Railroad (which were among the most extensive buildings of the kind in the country) were consumed by fire on the 18th ult., and property to the amount of $150,000 destroyed. There were 20 first-class locomotives in the "Round-house" when the fire broke out, but every one of these was saved through the herculean and intrepid labors of Mr. John Sweeny, one of the chief machinists, and the mechanics under him. The fire originated in the machine-shop; all the outer walls of which were of stone, and very substantial, but the partitions were of wood. Had they been brick or plate iron, as they ought to have been, there would have been no fire of any consequence. There was a full insurance upon everything in English insurance companies, which do a large business in the West.

There are four street (horse) railroads in the city, owned by two companies. In winter each car is fitted with a stove and is heated comfortably—a fact which furnishes a hint for the city railroads of New York. An old stage proprietor recently played a keen dodge upon the owners of the rails, who had got up their associations and charters, and left him "out of the count;" and so his occupation was gone, until a bright idea flashed across his mind, which he soon put into execution. He took all his stages and fitted the wheels on axles of such a length that they could run in all the tracks. He also lowered the bodies of his vehicles, had them painted in fine style, and went into opposition on the railroad companies own tracks. As the latter could not prevent him running on the street, he at last compelled them to come to terms, and they bought all his trucks and gave him a handsome *bonus* of several thousands of dollars to "clear the track."

Some of the streets of the city are paved with what is called "Nickerson's pavement," the peculiarity of which deserves a description. The street is first properly graded, then a floor of inch pine plank, covered with coal tar on both sides, is laid down upon the ground, and upon this is placed edgeways planks six inches deep and three in thickness, which are also coated with coal tar. These planks run crosswise of the street, are kept an inch apart, with blocks at the foot, and the spaces between are then rammed with gravel and the pavement is completed. This wooden road affords a good foothold for horses; it is cheap, and a portion laid down three years ago scarcely exhibits any signs of wear.

Chicago is a great grain and lumber market; about 400,000,000 feet of lumber come in annually from Green Bay, Saginaw and other places. It is sent principally to the southern sections of Illinois. There are several grain stores which can contain 750,000 bushels of wheat each. This city is also distinguished for the manufacture of agricultural implements, especially harvesting machines, and Mr. McCormick, of reaper fame, has a very extensive manufactory. The re-rolling of railroad iron is carried on upon a large scale at Ward's rolling mill. Furniture of almost every description is also manufactured in great quantities, and some of the wholesale mercantile warehouses do a business far exceeding the ideas of persons who have never visited this city. Many of these traders import largely direct from Europe, and their goods come by way of Canada and the lakes. Several sailing vessels have gone direct from Chicago to Liverpool, down the St. Lawrence river, and one has even gone as far as Constantinople. Communication by "express" is about to be established with the Pike's Peak region, the trade of which is beginning to come East by way of the lakes. Finally, the people of Chicago believe (and with good reason for their faith) that, as their city is situated at the western extremity of the lake navigation, it occupies a natural position favorable for commercial purposes, and it will continue to expand with the increase of population in the Great West.

* * *

Chicago, Ill., May 8, 1860.

## COTTON-SPINNING MULES.

MESSRS. EDITORS—Please excuse me for drawing your attention to one or two remarks made in your article on the above subject, published on page 276 of the present volume of the SCIENTIFIC AMERICAN. You say you understand that self-acting mules do not make as good yarn as the old hand mules. The yarn is made on the self-acting mule by the very same process as on the hand mule; all the difference in them is, the former moves the carriage in, while the latter requires a man to do it, and the yarn is made in both cases before this operation takes place. I have often heard this remark made before, but I never found a man that could tell why the yarn was not so good on self-acting mules as on hand mules; and until I do so, I shall hold on to the opinion that the former make as good work as the latter, and have superseded them in all cases where they have had a fair trial. The Masonville Manufacturing Company took the premium at the Crystal Palace (New York), for cotton cloth, and the filling was spun on a mule of R. Roberts, of Manchester, England, made by Marvol & Davol, Fall River, Mass., and the warp was spun on the "ring traveler" frame made by Whiten & Sons, of Whitensville, Mass., and I think these machines will outrival any other, both in quantity and quality. I speak from experience, having been practically engaged in mule-spinning for many years. T. W.

Masonville, Conn., May 9, 1860.

[We are pleased that our correspondent has written to us upon this topic, because his opinion serves to throw light upon the notion which has found a somewhat extensive circulation regarding the yarn of hand-mule frames being superior to that spun upon the self-operators. We are practically aware of the fact that the mechanical operations of both kinds of machines are similar, and there can be no cause for a difference in the yarn on this account; but it has been held that when a frame is under the charge of an intelligent and experienced hand-spinner, the *piecers* are kept more diligently to work, and all things are maintained in a superior condition, so as to produce yarn of a more uniform quality on the *cops*. This is all that can be contended for in favor of hand-mules; as, without unremitting attention, the best machinery may produce very inferior work.

## THE HEXAGONAL CELL OF THE HONEY-BEE.

BY W. J. WEEKS.

"Nature to these, without profusion kind,
The proper organs proper powers assigned."—POPE.

Throughout the range of earthly creation, every species of animal existence is adapted to the sphere in which it was originally destined to live; and whatever may be the mechanical operations devolving upon an animal in its appointed sphere, it has been supplied with organs suitable for the perfect performance of these operations and endowed with *instinct*—an inborn knowledge—for the proper application of those organs. A few obvious examples will be presented:—The woodpecker excavates the tree for its peculiar nest, the mole tunnels the earth, the beaver constructs its dam, the spider weaves its attenuated web, and the silk-worm spins the tissue of its golden shroud, each by means of one organ or more, especially adapted to the purpose. The principle is universal; the bee, at least, does not form the exception. In the fabrication of its waxen cells, the indispensable organs are the *antennæ* and the *mandibles*—the former to direct and guide, and the latter to execute the work. The antennæ (of which each bee is furnished with only a single pair) proceed from the interior part of the head, between the eyes; they will be more minutely described hereafter. Speaking of antennæ, Huber says:—"It is by means of these organs that bees gain the knowledge of their combs, their young, their companions and their queen, all communicated by the sense of feeling." Dr. Bevan says:—"The antennæ have generally been considered as the organs of touch, and indeed, in popular language, they are usually called feelers or horns; they have likewise assigned to them the office of wiping and cleaning the eyes. The antennæ however, are not regarded as feelers by our leading entomologists: at present their uses are not clearly defined. Some have regarded them as organs of smell, others as organs of hearing; and a third party have conceived that they perform some function of which man has no definite idea—supplying the insect with a *sixth* sense, or an intermediate faculty (according to Messrs. Kirby and Spence) between hearing and touch, rendering it sensible of the slightest movement of the circumambient air."

In reality, the antennæ are indispensable to the bees, not only in the construction of their cells, but in performing every other one of their varied duties, and for communicating with each other; a bee deprived of its antennæ must soon perish for want of that knowledge of external objects which it previously acquired *solely* through the antennæ. Huber tried the effect of amputating the antennæ upon a large number of bees—larger perhaps than was necessary to subserve the cause of science; and the result is here given in his own language. He says:—"We amputated the antennæ of 200 males and 300 workers. On being released, the latter speedily revisited the hive; but we observed that they did not ascend the combs as usual; that they no longer shared in the common operations, and pertinaciously remained below where some light was admitted from the entrance. This proved their sole attraction. They soon departed to return no more. The same effect was produced on the males. As the amputation of only one of the antennæ had no perceptible effect on the instinct of queens, neither had a similar mutilation any influence on that of males or workers, privation of a small portion of their organs did not impair their faculty of recognizing objects, for they remained in the hive and pursued their wonted labor."

Notwithstanding the foregoing testimony, however, we shall find thot the perfection of both antennæ is necessary to the complete construction of the cells. An essential and peculiar function of these organs and the *principle* of their application—facts which have remained so long unexplained—will be specified in a future article.

[To be continued.]

## BARN-YARD MANURE.

The following is a condensation of the opinions of Dr. Cameron, at the *Irish Agricultural Review*, expressed at a late meeting of the Dublin Chemical Society:—

1st. Farm-yard manure, when applied in sufficient quantity, is the best manure which can be employed alone, inasmuch as it contains all the elements required to nourish every kind of cultivated plant.

2d. A mixture of farm-yard manure and superphosphate of lime or guano, formed the best fertilizer that could be employed for every kind of crop, but more especially turnips, and root crops generally. The farm-

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yard manure supplies all the elements of the food of plants, and by its decay in the soil causes the latter to have a higher temperature than it would have if manured with guano or superphosphate of lime alone. The artificial manure was a valuable auxiliary to the natural; it contributed one, and sometimes two, and three ingredients of the food of plants; but it was especially useful as a means of forcing the young plants out of the reach of the fly.

3d. Whilst Peruvian guano, in combination with superphosphate of lime, or farm-yard manure, was a most valuable adjunct, yet its continued use, *per se*, would be attended with injurious results, and for the following reason:—Peruvian guano contained a very large proportion of ammoniacal matter in relation to the amount of phosphate of lime found in it. This ammoniacal matter acted as a solvent upon certain constituents of the soil, and rendered them available for the purpose of vegetable nutrition much sooner than would be the case if no guano were applied. Thus the guano not only contributed, itself, to the food of plants, but enabled the plants to draw (so to speak) in advance upon the resources of the soil, which, if they did not exist in great abundance, would speedily be exhausted under the stimulating influence of the guano. *In limine* —the effects of the prolonged use of Peruvian guano may justly be compared to those produced by the adoption of the Tullian or Lois-Weedon system of tillage. In both cases the soil will sooner or later be exhausted of its store of fertilizing matters.

4th. Phosphate manures, such as superphosphate of lime, and even such as phospho-Peruvian guano, which contained a moderate proportion of nitrogenous matters, exerted but little solvent action upon the fertilizing constituents of the soil. The effects, therefore, which such manures were observed to produce in the development of plants might be attributed solely to the nutriment afforded by these manures, and not to the intervention between the plant and the soil.

He recommended the employment of the natural and artificial manures in conjunction, and stated that the results of his own observation led him to recommend a mixture of two parts of superphosphate of lime and one of Peruvian guano, in preference to the use of guano alone; and this mixture might with advantage be employed for every variety of crop.

## TREATMENT OF INVENTORS BY GOVERNMENT.

MESSRS. EDITORS:—The process of manufacturing cast iron into steel, by which the steel cannon are made on the continent of Europe, is a *secret* American invention. It was discovered in the State of Maine, and was sold for $80,000. This improvement has not been, and now will not be, made known in the United States to the government, for the reason that the improvements of citizens are appropriated by the federal authorities to the use of the service whenever an opportunity presents, and afterwards every possible effort is made with the heads of departments and with Congress to prevent the inventor from being remunerated; even if he has a patent right, it is evaded if possible, or it is treated as beneath the notice of the government. Old books are raked up in all languages, from all parts of the earth, to assail the patent—they all are said to contain it; and, finally, if no other dodge can be resorted to, the committees in Congress are told that may be something else can be found to answer as well, and may be the government can dispense with it, and, therefore, it is of so little value that it ought not to be paid for. The fruits of this piracy of citizens by the federal authorities is beginning to show itself. It will spread like a pall over the country; ingenious men are driven to sell their discoveries in Europe, where they are honorably and liberally rewarded, and, in the end, we shall be far behind in the arts of peace as well as in the appliances of war.

The prosecution, before Congress, for the use of Hubbell's thunder-bolt shell, which destroyed the Bogue forts, near Canton, China, with such surprising rapidity, is another evidence of the fallacy of trusting the federal authorities at Washington. If a citizen has to spend time and labor to prosecute a private claim before Congress, it becomes so troublesome that the straightforward course of doing business on honor with the European governments is more satisfactory to inventors.

A SUBSCRIBER.

Philadelphia, Pa., May 8, 1860.

## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Wednesday evening, the 2d inst., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; Mr. Howe in the chair.

### MISCELLANEOUS BUSINESS.

Mr. Montgomery exhibited a steam boiler guage cock, the invention of J. F. Cook, of Baltimore. The orifice of the cock is closed by a plug faced with vulcanized rubber, the plug being attached to and operated by a horizontal lever. This lever is furnished with a sliding weight, by which the amount of force required to open the cock may be adjusted, and thus in a measure acting as a safety valve, or an assistant to the ordinary safety valve. It is claimed that this contrivance is more easily operated than the ordinary try-cock, and is less liable to leak or get out of order.

Messrs. Howell & Co., of this city, exhibited a tea-kettle the lower part of which is surrounded with a band of sheet iron, designed to enclose and retain the hot air rising from the fire. The inventors say that by this attachment water in the kettle may be made to boil in a much shorter time than without it, and that the water will retain its heat longer after the kettle is removed from the fire.

Both of these inventions were referred to special committees.

The chairman here announced the regular subject:—"Expansion."

### DISCUSSION.

The chairman remarked that the subject was one of great practical as well as scientific interest. In many of the arts the fact of expansion is of great service to us, and in others we guard against it as an enemy. We are yet to make new applications of it, and discover where in some unseen way it has been productive of harm.

Mr. Veeder—During one of the cold days of last winter an iron tie-rod in a building in Albany fell from its place, and broke into three pieces, the rod was only six feet in length. Had the rod ever the strength suitable for its use, and was it weakened by the constant expansions and contractions from changes in temperature? It is a well known fact that bodies are more brittle as they are colder.

Mr. Dibben—I should attribute the accident solely to the bad quality of the iron. An exceedingly small amount of phosphorus will make iron "cold short," and unfit for purposes where tensile strength is required. The connecting-rod of the *New World*, which broke last summer, showed a crystalline fracture, with none of the fibrous character of good wrought iron.

Mr. Veeder examined with the engineer the connecting-rod of the *Hendrick Hudson*, which broke last week. The fracture was oblique and had a surface six or eight inches long. A part of the fracture had a honey-comb appearance, due perhaps to imperfect welding, by reason of the sand and borax getting into the joint. Constant vibration of iron weakens its strength, and on this account connecting-rods, iron in bridges, &c., should be replaced as soon as signs of weakness show themselves.

Dr. Young—Extensive cold will render the best iron very brittle. Iron chains in winter cannot sustain near as much weight as in summer.

Mr. Dibben—Heat steel to welding heat and continue to hammer it till it cools to a dark red, and you may make a good cutting edge. But the same steel hammered only at the greatest heat will become a far inferior article. Heat a knife and temper quick and you have a poor knife. The hotter you heat without hammering the less strength you will have; or take any edge tool and heat it without hammering again, and it will be spoiled. The heat expands or separates the particles and hammering is needed to bring them together again.

Mr. Veeder—I frequently observe that the wire in fences and other places about my farm is losing its toughness. It is harder to bend but easier to break than when new.

Mr. Johnson—At Westport, Conn., is a wooden bridge, with a continuous iron hand-rail 700 feet long. On a warm summer's day the rail is so much expanded that it is seriously twisted out of shape, almost any one crossing the bridge on a warm day would notice it.

The Chairman—Iron absorbs heat faster than wood.

Mr. Garvey—In building, materials of different expansive powers should not be placed together. Iron wire loses its strength by oxydation, when exposed, and the oxydation may be of such a character that the wire may appear harder.

The same subject is to be continued next week.

NOTE.—Our reporter says that about half of the time of this meeting was consumed in incidental business matters which have no interest for the public. We think the Institute will do well to "lay by" for a month or so, to recuperate its energies and thus prepare for another intellectual "mill." If it continues in its present dry *status*, the newspapers will cease to notice its proceedings and it will soon run to seed.—EDS.

## CONSUMPTION AND ITS CAUSES.

At a meeting of the Geographical and Statistical Society, held in this city on the 3d inst., a valuable paper was read on the mortality of consumption by Henry B. Millard, M.D. He estimated that nearly one-sixth of the deaths among the human race occur from consumption. From statistics extending over a considerable period, he found that one death in every 5.7 occurred from consumption. In New York, from 1804 to 1820, one death in every 4.3 was caused by consumption; from 1820 to 1835, one in 5.4; from 1835 to 1850, one in 6.5; 1848 to 1859, one in 8.46; in Brooklyn, 1848 to 1859, one in 8.11. Of deaths in the army, he found that the greatest number of cases of consumption was from 6.9 to 9.2 annually for every thousand men, between latitudes 36° and 25°, characterized by high temperature, copious rains and excessive moisture. The smallest number of deaths was 1.3 per thousand men, in New Mexico, characterized by high land and dry atmosphere. While consumption is rare in countries of high latitudes, it is curious that in tropical countries the proportion of deaths is often too small to be calculated. In all Judea, in 43 years, only 29 died of consumption. The theory that the sea air may prevent, as well as cure, consumption, is supported by statistics. In the British army, out of 14,590 men, 51 died of consumption; while out of 12,942 men in the navy, only 19 died of that disease. Consumption is not necessarily more prevalent in large than in small cities. Among the trades and professions, the following order of mortality by consumption was mentioned:—The greatest was among tailors, shoemakers; next came blacksmiths, gardeners, bakers, butchers and lawyers; the mortality among tailors being four times that of the lawyers. The greatest mortality by consumption among males is said to be in the city. There is greater liability to consumption between the 20th and 30th years of age than at any other period of life. The general conclusion was, that humidity of the atmosphere is favorable and dryness unfavorable to the generation of the disease, but moist salt water is not calculated for its development. Want of exercise and air tends to produce it. It is more prevalent among females than among males. There are no reasons for the conclusion that the disease is either on the increase or decrease.

At the conclusion of the reading of Dr. Millard's paper, the thanks of the meeting were presented to him, and a copy requested for the archives of the society.

## EGG-HATCHING MACHINE.

MESSRS. EDITORS:—For the benefit of many of the readers of your valuable journal, I send you the following description of an apparatus of my own invention, for hatching eggs by artificial means. It consists of a sheet iron box of any suitable dimensions—say 2 feet square. On one of the sides is a door, and on the top a chimney. The eggs are placed in boxes 18 inches square and three deep; each egg being first covered with cotton batting or feathers. These shallow boxes are placed, one above another, in the larger sheet iron box before mentioned, care being taken to separate them by small pieces of iron or—what would be better—having them made with small legs, so as to allow the heated air to circulate freely between them. About the middle of each of the four sides of the box is a pipe about 3 or 4 inches in diameter. The ends of these pipes are bent to receive the flame of an oil lamp that heats the air so as to be a substitute for the warmth of the hen. Thus, the whole apparatus is heated to a temperature which can be regulated by increasing or diminishing the size of the flame of the lamp. The chimney should be quite small, so as to keep the heated air as long as possible among the cases containing the eggs.

W. B., Jr.

Darien, N. Y., May 8, 1860.

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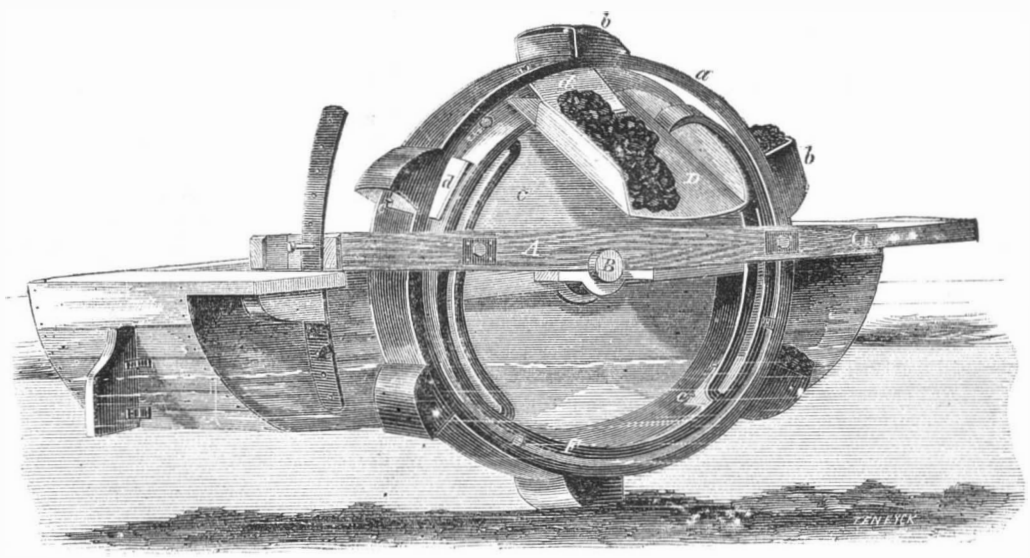
## BARCROFT'S IMPROVED DREDGING MACHINE.

We have frequently thought, when watching the operations of a steam dredging machine, that there was more power expended in moving the machinery in proportion to the power required for doing the work than in any other mechanical operations. While the power required to scoop-up a bushel of soft mud and lift it into a scow is not very great, the various motions of the massive and complicated machinery by which it is accomplished in the ordinary steam dredge does consume a great deal of power. This matter has long been understood, and efforts have been made to devise dredges with simpler and lighter operating parts. In the one here illustrated, the buckets are attached to a revolving wheel so that they move with a continuous rotary motion —the simplest and least objectionable of all mechanical movements.



BARCROFT'S IMPROVED DREDGING MACHINE

To the periphery of the revolving wheel, C, the buckets, *b b*, are attached; the frame, A, of the wheel being secured to the side of a scow or boat, by pivots at one end, and by a curved arc at the other, so that it may be raised or lowered to act in various depths of water. The bottoms of the buckets are hung at one side upon hinges, the other side being pressed up during their ascent by the curved iron bar, F, which is secured rigidly to the frame, A, just within the outer rim of the wheel. This bar terminates at the spout or discharge box, D, which is made to guide the dirt or mud into the receiving scow, so that when the buckets reach this box their bottoms fall down at the outside, discharging their contents into the guide box. The end of the curved bar, F, with which the bottoms of the buckets come in contact after being emptied, is bent inward at an easy curve so that the bottoms may be pressed gradually back to their places without any sudden jar. Friction rollers, *f*, are interposed at suitable intervals between the wheel and the curved bar, F, so that the latter may operate as a support to the wheel to aid in resisting the strain when the buckets are forced into the mud.

Whenever the depth of the water and the nature of the bottom is such that this dredge will operate at all, it will manifestly work with great economy of power.

The patent for this invention was procured (through the Scientific American Patent Agency), on March 13, 1860; and further information in relation to it may be obtained by addressing the inventor, John W. Barcroft, at Washington, D. C.

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BENEFITS OF AGRICULTURAL MACHINES.—Previous to the introduction of improved implements in agriculture, famines were frequent in Europe, and an author states that sometimes thousands of men, women and children died of starvation, in England, while many of the living subsisted on the bark of trees and on acorns. Such scenes are now almost unknown. By the use of the steam engine all classes are benefited—none injured. With improved machinery the farmer can raise and secure a greater amount of produce, and can sell it at a less cost than otherwise. It is equally true that the mechanic and manufacturer can do the same with the products of their industry. The one class exchanges its products for those of the other, and each has the greater amount, and thus their condition is materially improved and their happiness promoted. That man is blind to the progress which our own country has made who does not know how much our people are indebted for their comforts and improved condition to machinery. The person who would declaim against machinery should be reminded that all above the teeth and nails of a man, in doing labor, is machinery, without which he would be only a respectable brute. Every improvement in agricultural machinery multiplies the capacity of labor, and therefore tends to increase the necessary and material products of a country; and these constitute its solid wealth. Some have asserted that an increase of agricultural labor, whether by manual, machine or animal-power, is not rewarded to the same extent as an increase of manufacturing labor. This, we conceive, is a wrong notion, having no foundation in actual practice.

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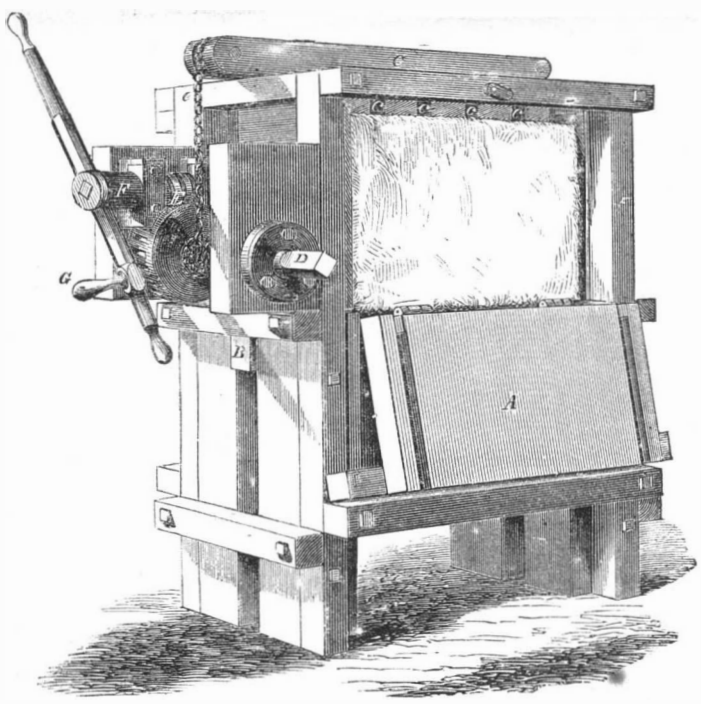
## IMPROVED HAY, HOP AND COTTON PRESS.

The invention which we here illustrate is worthy the attention of all who desire a cheap compact, portable



MILLER'S HAY, HOP AND COTTON PRESS.

press, which requires no bracing from without, but is complete in itself, and may be worked by hand-power.

A smooth box bound together with stiff timbers and iron rods, in the usual manner, is constructed with the upper head or end stationary, and the lower one movable as a follower. The lower portion of the box is made stationary, while the upper portion is closed by hinged doors, A, on two sides, and by sliding doors on the other two sides. The lower end-piece being let down to the bottom of the box, the hay or other produce is thrown in till the box is full, when the upper doors are closed, and the follower is drawn upward, compressing the hay. For forcing the follower up, the chain, *e*, is attached to the farther end (not shown) of the timber or iron bar, B, which passes through the frame beneath the follower, and being brought over two pulleys on the ends of the timber, C, is secured to the shaft, D. A similar chain passes directly from the near end of the timber, B, to the opposite side of the same shaft, so that when the shaft is turned the two chains will be wound around it in opposite directions, and the follower raised. The shaft, D, has a gear wheel upon it which meshes into the worm, E, upon the shaft, F, so that by turning the crank, G, the shaft, D, is rotated slowly, but with multiplied power. The usual grooves, *c c c c*, are made in the ends for the passage of the bands by which the bale is secured after it is pressed.

For pressing hops, a bag is laid in the box, and the hinged and sliding movable doors are dispensed with.

The patent for this cheap and compact press was granted (through the Scientific American Patent Agency), on March 20, 1860; and further information in relation to this valuable improvement may be obtained by addressing the inventor, David L. Miller, at Madison, N. J.

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## DOUGLAS'S VALVE.

MESSRS. EDITORS:—In your description of my valve (on page 304 of the present volume of the SCIENTIFIC AMERICAN), you omit one of the most important points. You speak of it as being merely a "supplementary exhaust," which would convey the idea that it acts merely as an enlargement of the exhaust; while, in reality, it not only lets off the water, but is a perfect back-pressure valve, remaining open after the exhaust port is closed, and until live steam enters the cylinder —not only diminishing the back-pressure, but relieving *all* back-pressure. Also, it not only lets off the water that collects "while engines are standing at stations," but is continually carrying off the water that collects in engines while in motion by priming of the boiler, condensation and what is carried on by the current of steam, and which otherwise must pass off with the exhaust or remain in the cylinder.

FRANK DOUGLAS.

Norwich, Conn., May 9, 1860.

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A NEW DISEASE AMONG HORSES.—A correspondent of the *Northwestern Farmer* (Dubuque, Iowa), writing from Clarke county, in that State, relates that an unknown and contagious disease exists among the horses in that section, and upwards of 40 have died within a short period. Its first appearance is indicated by a small swelling, extending from the ear down the throat latch to the jaw. The appetite of the animal becomes unusually great, yet he loses flesh rapidly, and grows weak, stupid and finally dies. Some horses are cut off by a few days illness, while others linger for about a month; it is generally considered fatal. In order to arrest the contagion of the cattle disease in New England—formerly described in our columns—it has been recommended by a committee of medical gentlemen to take the life of every animal immediately when the symptoms appear.

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MR. FAIRBAIRN asserts that the forcing of boilers and engines, and the working of steam without expansion, are great evils "which corrupt the mechanical system."

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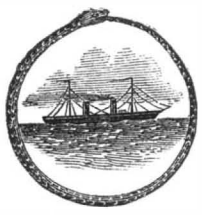
VOL. II., No. 21.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, SATURDAY, MAY 19, 1860.


## THE INCREASE AND IMPROVEMENT OF STEAMSHIPS.



UR shipping merchants appear to be in danger of losing the entire carrying trade of the Atlantic. Although our once unrivaled "liners" have fallen from the position of being the exclusive ocean mail and passenger carriers, they still retain considerable of the goods and *some* of the lower class of emigrant traffic; but even this is now threatened to be absorbed by the increasing number of steamships belonging to foreign companies. The Cunard Company have a fleet of large iron screw steamers (in addition to their regular mail line) which carry goods and *all* classes of passengers. The most extensive measures have recently been taken for absorbing the best share of the heavy cargo and lower grade of emigrant trade by these vessels, and thus take away the very kind of traffic which our vessels have latterly enjoyed. Agencies connected with them ramify Great Britain, Ireland and the continent of Europe; and they will commence to run next month, for this season, under more complete and energetic management than ever before. The Galway (Ireland) Company have four large iron steamers building at Newcastle, each of 3,000 tuns burden; and these are also intended to carry goods and all classes of passengers. One of them was lately launched, and great activity is being exhibited to complete them during the present summer; then they will also enter into direct competition with our ships. A late number of the Liverpool *Mercury* says, on this subject: "The mercantile marine of this country (England) far surpasses that of all other nations in extent, and is increasing in a much greater ratio than that of any other country. The consequence of this is that the British steamship owner has the carrying of nearly all the first-class passengers who cross the ocean, and all the finer and more profitable articles conveyed to or from this country. As far as second-class passengers and heavy goods are concerned, the British and American shipowners divide the greater part of the trade of the world between them." The latter trade, which is stated to be divided between our ships and those of Great Britain, is just the kind for which the new foreign steamers are intended. The *Mercury* says nothing about a new steam line which is soon to be in operation between Liverpool and New Orleans, on which several new steamers, of 2,000 tuns burden each, are to be placed, and which are to run at the rate of 11 knots per hour, with the consumption of only 20 tuns of coal per day. This line is to compete with our sailing ships, which have almost enjoyed the monopoly of carrying cotton from the South to England. With our wooden-built sailing ships we had the advantage over all other nations and were at one time masters of the seas, but iron screw steamers have "turned the tide against us" completely. They are, however, more expensive to construct and navigate than sailing ships, because they are furnished with ponderous engines and boilers, and they require a great and constant outlay for fuel, machinery and repairs. Viewing them in this light only, and not taking into consideration their more uniform and rapid passages, many of our shipowners believed—and have so asserted—that they did not pay expenses, and, as a consequence, they would ultimately be abandoned. Such ideas have proved a delusion; for instead of being abandoned, the number of screw steamers is greatly on the increase.

In view of these facts, the earnest question arises, "Can we not construct and manage steamers as economically as they do in England?" There are some grounds for hoping that improvements may yet be made in marine engines, which will enable us to build and navigate steamships at much less cost than has hitherto been done. The great expense of such vessels has not been in the first cost merely, although that is considerable, but in working expenditure. Well built engines will last a great number of years, but a constant consumption of coal is required every day. This is then the direction to which we may reasonably look for improvement. Smaller engines may yet be made to do the same work for which the common huge machinery is employed, and this would save original outlay and admit of more room for cargo and passengers. Then it has been demonstrated, recently, that steamships may now be built to run with one-half the fuel required by the more common old-fashioned steamers. The London *Engineer* states that there were recently lying at one of the docks in that metropolis, two steamers—the *Black Prince* and the *Thetis*—the latter a Clyde-built vessel, and the former a Thames-built one; both of about equal tunnage, and both bound for Genoa. The *Thetis* had 175 tuns of coal on board, which was considered sufficient for the voyage out and back; while the other had 350 tuns, and this amount was required for the outward voyage only, and yet the speed of both was about equal. The one required about 6 pounds of coal per horse-power per hour, the other 1½ pounds. The one was not only saving two-thirds of the coal, but at the same time carried 425 tuns more cargo in a voyage of the same length! Our marine engineers have not devoted sufficient attention to improvements in the machinery and the boilers for the saving of fuel. Such inventions are not unknown, but too much conservatism has been displayed in all our large steamers. At present there is an apparent opening for a bold movement, by some company, in the right direction. The old arrangements should give way before the new improvements; we may now adopt the most superior engineering practices with success and ultimate advantage.

## COUNTY BONDS FOR RAILROADS.

Judge Love, of the United States District Court for the State of Iowa, has recently made an important decision in relation to the validity of bonds issued by the counties of that State for the construction of railroads. The validity of such bonds has long been questioned, owing to an alleged want of power in the counties to subscribe in that manner to stock in railroad companies. Many years ago, the question was brought before the Supreme Court of that State, and a majority of the judges were of the opinion that this power was possessed by the counties. The rage for railroad building soon succeeded, and the counties exerted the power they had been thus held to possess in a most liberal, not to say reckless, manner.

The revulsion which commenced in 1857 produced a great change in the popular mind on this subject, and this change even found its way to the bench of the Supreme Court. The judges who composed that body had been entirely changed in the meantime, and the present bench have given evidence that they entertain views directly opposite to those of a majority of their predecessors. They are evidently restrained only by a sense of judicial propriety from reversing the previous opinion of that court, and some decisions which they have actually made are regarded by many as going far towards declaring these railroad bonds illegally issued, or as being, at least, an entering wedge to a course of decisions which should eventually entirely overturn the doctrine laid down by the old Supreme Court.

In this state of affairs, a suit was recently brought against the county of Jefferson, in the State of Iowa, to collect the interest due on some of their bonds which had been given for railroad stock. The defendants contended that the bonds were illegally issued, but the court held that, although the Federal courts would follow the Supreme Court of a State in the construction of a State law, still that the action of the new court had not overruled the decision of the old; and that, even if this were otherwise, the Federal courts, in acting upon a contract, would always look to what the State decisions were at the time the contract was entered into, and adopt the construction of the law which then prevailed.

There is great good sense in this opinion of the court. To adopt any other rule would be to permit a State, through its judiciary, to make a law which would work the greatest injustice. The law is not to be sought for solely in the statute book. The act of the Legislature, as construed by the Supreme Court of the State, is the law in force at the time; it enters into all the contracts which shall be made while that state of things exists. A change in this construction of the law is tantamount to the enactment of a new law. To make this new law retrospective so as to affect rights which were acquired while the former construction prevailed, would be, in effect, to make a law which would impair the obligations of a contract. We are glad to see the Federal courts taking this sensible view of the case, and have no doubt the decision of Judge Love will be sustained by the Supreme Court at Washington whenever the proper occasion is presented.

Cities, counties and railroad companies have shown a remarkable willingness to borrow money by the issue of bonds and stock certificates; and would have resented even the slightest intimation of want of honor on their part to deal justly with their confiding creditors. Some of these corporations now turn round and kick at every creditor who dares to ask for a return of what is his honest due; and they are seeking, by all sorts of legal and illegal quibbles, to worry the creditors out of their just claims. A man who would thus treat his neighbor, yet having the ability to pay, would be the object of deserved execration. In our opinion, it is high time to stop this unhallowed system of repudiation; and we hope that all corporations who thus seek to dishonor their obligations will be made to pay to the uttermost "mill." The value of real estate in the cities and counties where these improvements are laid have advanced, in consequence, from ten to twentyfold. We are informed by a resident of one of our cities now trying to repudiate its honest debts, that since the opening of the railroads towards which the municipal credit was pledged, the land has advanced from $150 to $1,000 per acre. This consideration alone should induce the citizens to submit peacefully to a tax which has contributed so much to their wealth and prosperity.

## CITY BOILER INSPECTION.

Before the New York Legislature adjourned at its last session, a bill was passed for the inspection of steam boilers and the better preservation of life from explosions in this city; but we understand that it has not yet become a law, because the governor has not attached his signature thereto. Knowing that a great number of accidents have taken place from explosions, owing to the increased employment of high pressure boilers in manufactories; and knowing that most of these explosions have been caused by carelessness or cupidity, and that such accidents can be provided against, we have advocated the passage of such a bill; believing that, if its provisions were carried out, they would result in greater security to life and property. We have been informed that the governor considered it a scheme for creating some new political offices, and that it would not be of any ultimate benefit, but rather a burden upon the people. It is true that too many of the offices which have been created for the ostensible purpose of removing evils, have become evils themselves; still we should like to see this bill fairly tested to ascertain what would ensue from its operation. If found ineffectual, it might be repealed; if it proved beneficial in some features and detrimental in others, the latter could be removed by subsequent amendments. If all our manufacturers who employ steam boilers were to form a voluntary association for boiler inspection, such as they have in England, we would prefer it to any legislative measures on the subject, and we advise them to organize at once for this purpose. Something positive is demanded for the safety and inspection of boilers in this city. In many of the streets there are huge steam boilers under the pavements, which, if not maintained in proper condition, are liable to explode and scatter wholesale death and destruction among crowds of persons walking above. Most of our daily newspapers and other printing establishments have their boilers situated in their street-vaults. These should be regularly inspected by competent persons, and we believe that the proprietors of these establishments are favorable to such a system. When the very pavements upon which our people tread are converted into *slumbering volcanoes*, it is high time that the people should inquire earnestly into this subject, and provide means—as far as this can be done—to insure the public safety.

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## ELECTRIC LIGHTS FOR LIGHTHOUSES.

We have entertained the hope, for a considerable period of time, that electricity would yet be practically applied as a superior illuminating agent for many purposes. Science favored such a view of the subject, as the obstacles to its accomplishment never appeared so great but that invention and improvement would ultimately surmount them. Such is the substance of the opinions we expressed on this subject, on page 69, Vol. I, (new series) of the SCIENTIFIC AMERICAN, and we have now the pleasure of stating that our anticipations have already been partly realized. In a recent number of the London *Mechanics' Magazine* there is an abstract of a paper by Professor Faraday, F.R.S., which was read at the Royal Institution on the 9th of last month, in which a detailed description is given of the application of the Electric Light, to the South Foreland Lighthouse (England) by Professor Holmes. He stated as follows:—"Before this application was permitted, the apparatus had to undergo a severe test by the members of the Lighthouse Board, as to its expense, wear and tear of the apparatus, steadiness for 16 hours burning; its liability to extinction, and many other contingent circumstances. The current of electricity is obtained from a magneto-electric machine; neither frictional nor voltaic electricity are used. A number of powerful magnets are arranged on a shaft, and made to revolve near to the poles of helices wrapt around a core of soft iron. Currents of electricity are thus generated, and the wires of the helices are connected with a commutator, which gathers the various currents produced in the helices, and sends them up through two insolated wires in one common tide of electricity, thence into the lighthouse lantern. Two magneto-electric machines are employed at the South Foreland Lighthouse, and each is operated by a two-horse-power steam engine. Excepting wear and tear of the apparatus, the whole of the material consumed to produce the light are coal and water for the boilers of the engines and carbon points for the lamp in the lantern."

Professor Faraday says:—"The electric lamp embraces a very intricate arrangement of mechanism. Two carbon points are retained between the electrodes (ends of the conductor) and between these points the light is generated, by the current removing the carbon particles. The apparatus is so adjusted by the compensating operations of the mechanism that while the carbon points waste away, the light remains unchanged. The electric wires end in the bars of a small railway and upon these the lamp stands. When the carbon points of one lamp are nearly gone, that lamp is lifted off and another instantly pushed into its place. The machines and lamps have done their duty during the last six months in a practical manner. The light has never gone out through any defect of the machinery; and when it has been extinguished in the lantern, a single touch of the keeper's hand has set it shining as bright as ever. The light showed itself up and down the British channel, and even right across into France, with a power surpassing that of any fixed light within sight, or anywhere existent. The experiment has been a good one. There is still the matter of expense to be considered, but it is the hope of all interested in the subject that its superiority will ultimately justify its full adoption."

While it appears beyond a doubt that this light is wonderfully brilliant in comparison with others, yet its expense must be much greater than that obtained by the use of the Fresnel lens with the best oil in the common mode. Two steam engines, although quite small, are certainly more troublesome and expensive than the usual oil lights which do not require to be renewed for several hours. A caloric engine would be more suitable for this purpose. We believe that some further improvements to reduce the cost of operation, are yet demanded before the light can be more generally adopted. That it is now rendered practical is beyond a doubt. Professor Faraday has given his testimony to its steady and successful application for six months in a very public situation.

## Literary Notice.

THE THRONE OF DAVID, or the Rebellion of Prince Absalom. By Rev. Dr. J. H. Ingraham, Rector of Christ's Church, Holly Springs, Miss. 12mo., pp. 603; price $1.25. Published by G. G. Evans, Philadelphia.

This author has written two other works, viz., "The Prince of the House of David" and "The Pillar of Fire," which have had a large sale. The present work is designed to make the reader familiarly acquainted with events in the reign of King David; in the discharge of this task the author has wielded an eloquent pen, guided by a fervid imagination.

## INDUSTRY—MANUFACTURES—COMMERCE.

A large schooner lately arrived at Newport, R. I., from a cruise after sea-elephant oil in the vicinity of Desolation Islands, which are situated west of Cape Horn. It had been quite successful, and had obtained a full cargo. Ten American vessels were on the coast, fishing, when the schooner left, and one ship had 3,300 barrels on board. The schooners generally operate as tenders upon ships and are employed for navigating the rivers where the sea-elephant abounds.

The experiments undertaken for the purpose of acclimating the tea plant in some of our southern States, have been in a measure successful. About 18,000 plants have been sent into districts of South Carolina and Georgia. The late Dr. Junius Smith, of Greenville, S. C., was the first person who made efforts to cultivate this plant in our country. He met with only partial success, but he always held to the opinion that our climate and soil were favorable to its growth.

The receipts of the United States Treasury, for the quarter ending with March, were $23,247,000, of which $15,000,000 were from customs; $500,000, from the sale of public lands; $249,000, from miscellaneous sources; $5,588,000, from treasury notes; and $1,910,000, from the Loan Act of 1858. The expenditures were $20,376,000—of which $11,500,000 were for civil and foreign intercourse and miscellaneous expenses; $3,037,000, for the War Department; $2,444,000, for the Navy Department; $1,095,000, for the Indian Bureau and pensions; and the remaining $2,300,000, for the interest of the public debt, the payment of treasury notes, &c.

Mr. Taylor—late American consul at Manchester (England), and agent for the Cotton Association of Georgia—has returned to the United States with full powers to take the initiatory steps to establish a direct cotton trade with continental Europe. Congress has already passed a law, making Macon, in Georgia, a port of entry, with a view of admitting such goods as may come from Belgium and other European States, to be exhibited at the contemplated fair in that city.

A great California land suit was decided, two weeks ago, by the United States Supreme Court, at Washington. It involved 10,000 acres of land in the city of San Francisco, and 20,000 acres outside of its limits—all valued at $10,000,000. The Land Commissioners in California and a district court had decided that the claim was good, but the Supreme Court reversed these decisions. The evidence satisfied the judges that the claim was fabricated in 1850, and ante-dated, as if it were an old sale prior to the conquest, and it was declared to be a fraud.

The Common Council of New York has appropriated $15,000 for what are called the "Metropolitan Gas-burners," to be applied to the street lamps and the public buildings belonging to the municipal government. This burner is also a regulator, as it has three chambers near the tip to make the gas flow in a more steady stream. It is claimed that with a consumption of only 3½ cubic feet per hour, the burner will give as good a light as the common *Scotch tip*, consuming 5 cubic feet per hour. There are about 14,300 street lamps in the city.

The value of imports received in New York during the month of April was $16,971,358. A larger proportion than usual was entered for warehousing. The value of our exports for the same period amounted to the sum of $10,371,415, of which $2,995,502 were specie. The receipts of foreign specie were only $49,186. For the same period, in 1859, our exports were $13,033,866, and our imports, $22,425,619. There has therefore been a considerable decrease on both sides.

## FOREIGN NEWS AND MARKETS.

*Railroad Casualities on the Continent.*—Casualities based upon the most authentic returns, have established the facts that since the introduction of railroads into France, there has only been one traveler killed in every two millions of passengers. When the old-fashioned diligences were in use, there was on an average in ten years, one killed in every 356,000 travelers, and one wounded in every 30,000. In Belgium only one has been killed in every seventeen and a half millions, and one wounded in two millions. In Prussia and the Duchy of Baden there has been one killed in every seventeen and a half millions of passengers, and only one wounded in 1,200,000. In England there were only one death in 15,500,000 travelers on railroads in 1858.

*Food and Respiration.*—Dr. E. Smith has communicated to the Royal Society, London, the results of series of experiments made with the view of determining the influence of various kinds of aliments exerted upon the respiration. The following kinds of food were those employed:—1 Starch series.—Arrowroot, arrowroot and butter, arrowroot and sugar, commercial starch, wheat starch, bread, gluten, oatmeal, rice, rice and butter, potatoes and gum. 2. Fats.—Butter, olive oil, and cod liver oil. 3. Sugars.—Cane sugar, grape sugar, milk sugar, cane sugar with acid and alkalies. 4. The milk series.—Cows' new milk, skimmed milk, casein, casein and lactic acid, lactic acid, cream, sugar of milk and lactic acid. 5. Alcohols.—Spirits of wine, whiskey, brandy, rum, gin, sherry and port wine, and stout ale. 6. The Tea series.—Coffee berries and leaves. 7. Various nitrogenous substances.—Albumen, gelatine, fibrin, and almond emulsion. It was found that starch and fat do not, as might, a *priori*, be supposed, increase the amount of carbonic acid exhaled from the lungs. Wheat, oatmeal, and rice greatly increase the exhalation of carbonic acid, an effect also produced by milk; sugar was found to be even more energetic than milk in exciting the respiratory function to increase activity. Coffee berries increased the quantity of carbonic acid; whilst the leaves of the same plant caused a diminution, thus proving that the leaves cannot, as has lately been proposed, take the place of the berries as an article of food. The effect of alcohol depended on the form in which it was taken. It increased the amount of carbonic acid, in the case of rum, sherry wine, and malt liquors. Every kind of nitrogenous food stimulated the respiratory organs.

*Indian Wool.*—An interesting statement was lately made before the Bradford Chamber of Commerce (England) by Mr. Dazell, collector of customs at the Indian port of Kurrachee. Wool, he stated, was the great staple of export from that place. Seven years ago the value of the wool exported from it amounted to but £20,000; last year (1859) it exceeded £400,000. Eight-tenths of this wool was produced in Affghanistan, in the mountainous district ranging from 25° to 35° of north latitude. It was an entirely pastoral country; vast flocks of sheeps tended by the shepherds of wandering tribes covered the mountains and valleys. The inhabitants were clothed with woolen fabrics, and their tent covers, ropes and bags, were made of the product of sheep's wool. Scinde has large wool-growing districts, and the trade with England might be greatly increased, especially in long wool.

*Indian Indigo.*—In all likelihood the price of indigo will undergo a rise, especially for the best qualities. In the district of Krishnaghur there has been an extended agrarian uprising of the peasantry, who formerly cultivated the indigo plant. The indigo planters, who are mostly Europeans, have been accustomed to make advances to the native magistrates for the future crop. This season, these native leaders have endeavored to avoid their obligations, by not cultivating the plants, and as a consequence, most of the indigo factories have been stopped. Bands of the peasantry, armed with clubs, had traversed the country as mobs, threatning the Europeans. The latter, with a small military force, have restored tranquility, but the indigo crop for the season, will be almost *nil*.

## A CRUMB FOR INVENTORS.

MESSRS. EDITORS:—Some at least, of the Examiners in the Patent Office look after the inventor's good, as will appear from the following fact. In the late extension of House's telegraph patent, it was seen that the inventor would only be benefited $10,000 thereby; while the assignees of his entire right would be very largely rewarded. The fact was set forth to the Commissioner by Examiner Henry, and also to the assignees by their attorney. The assignees becoming alarmed as to its fate, at once re-assigned to the poor inventor *one-third* of the whole! and this was sufficient in the eye of the law to justify the extension, which otherwise (it was believed by the assignees) would not have occurred, since the extension is, by law, for the *inventor's* special benefit. M.

THE venerable Chief-justice Taney recently fell from exhaustion, while sitting on the Bench. It is feared he will never preside over the Supreme Court again.

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## WEEKLY SUMMARY OF INVENTIONS.

### LOZENGE MACHINE.

The object to be attained by this invention is to perform the work of rolling a sheet of paste, into which the lozenge compounded is made, and making it of the required uniform thickness, and then stamping out the lozenges therefrom by machinery suitably adapted to this purpose. The invention consists in the employment of a gang of cutters, either round, square or oval, arranged on suitable guide bars and receiving an alternate reciprocating motion, imparted to them by eccentric or pin wheel and spring movement, and arranged in such a relation to a fixed plate, placed parallel with the ends of the cutters and with suitable feed rollers, that the sheet of paste will be fed down before the cutters at each movement of the same, the lozenges will be cut therefrom, and punched out of the cutters in their receding movement from the fixed plate. The credit of this contrivance is due to W. J. McClelland, of this city, who has assigned it to E. Greenfield, of No. 71 Barclay-street.

### CAP-FORMING MACHINE.

This invention has for its object the forming of cap bodies in a single piece or without a seam, and at one operation. The invention consists in the employment or use of a flexible or sectional "former," so arranged that it may, after the body is formed on it, be elongated so as to be capable of being withdrawn from within the body. The invention also consists in the peculiar means employed in connection with the flexible or sectional former, whereby the wool may be properly disposed or distributed on the same. The inventors of this improvement are J. L. Bridge and W. B. Lodge, of Vernon, N. Y.

### PIPE MACHINE.

The object of this invention is to obtain a machine by which sheet metal pipes of considerable length may be expeditiously bent in cylindrical form and locked, the invention being designed for bending pipes for water leaders, stoves and other purposes. The invention consists in the employment or use of adjustable rollers, a removable "former," a brake or locking bar, and a pipe support. This improvement was designed by C. T. Boardman, of Bergen Point, N. J.

### THERMOMETER FOR STEAM APPARATUS.

In thermometers for steam purposes the mercury tube is ordinarily packed in the piece which screws into the boiler or steam vessel, and the upper part of the said tube and the scale are protected by a cylindrical metal case whose bottom is secured to the piece which screws into the boiler by small screws. It requires but a very slight strain on this case to loosen the joint at its bottom and snap off the tube; and this accident is of frequent occurrence where such thermometers are used, more especially in dentist's india-rubber or gutta-percha vulcanizing apparatus, in which, owing to its position, the thermometer forms too convenient a handle to prevents its being used as one by careless persons. The principal object of this invention is to prevent such accident, and to this end the invention consists in making the case and the part in which the tube is packed in one piece, and screwing the same on to the exterior of the piece which screws into or is attached to the boiler. The invention also consists in certain means applied in combination with a valve to the piece which attaches the thermometer to the boiler, so that, in small steam apparatuses like those used by dentists for vulcanizing india-rubber or gutta-percha, the said valve may be used both as a safety valve and a blow-off valve. This device has been patented to G. E. Hayes, of Buffalo, N. Y.

### AIR PUMP.

The object of this invention is to enable the air pump of a condensing engine to be worked at as high a speed as it is desirable to work the engine without producing the concussion which attends the working of the air pumps in common use for such engines, and which are more or less violent according to the speed of the engine; and to this end the invention consists in the employment in such an air pump of a piston or plunger elongated at one or both ends, whereby both water and air are caused to be discharged simultaneously from the commencement of the stroke, and sufficient air is retained to serve as a cushion to the piston to the end of the stroke. The invention also consists in a certain arrangement of the passages and valves, whereby the simultaneous discharge of water and air is provided for. The patentee of this invention is D. A. Woodbury, of Rochester, N. Y.

### SPINNING MACHINE.

This invention secures the advantage of arranging the gear wheels outside of the casing which encloses the rollers, and inside of a screw-threaded box, and thus, whenever the roving or sliver is broken, it can never get entangled with the gearing of the individual or of an adjacent set of twisting and drawing rollers, as is frequently the case, and a source of annoyance as well as a loss of time in the machines now in use, which have the gearing of the rollers unprotected or not surrounded by a circumferentially screw-threaded box and the rollers encased as Mr. Crowell claims. This invention secures the further advantage of ready access to the gearing rollers, although perfectly encased, whenever it is necessary to adjust the same. We regard this a very excellent improvement, and wish the inventor a good reward for his display of ingenuity. J. E. Crowell, of Chelsea, Mass., is the inventor.

### GOLD AMALGAMATOR.

This invention consists in arranging two disks horizontally on vertical shafts or axles. One disk moves to the right and the other to the left. The surface of the lower disk is channeled or made like the bee's honeycomb, so as to contain and form a bed of mercury. The top disk has a conical hopper, which fits over a conical hub of the lower disk. The precious substances are fed down between the disks, and as the disks revolve in opposite directions the plane of mercury sweeps under the passing precious substances, and thus a perfect amalgamation is accomplished. This is a simple and durable machine, and it does seem that its operation must be very effective. The credit of this contrivance is due to J. A. Brock, of Chicago, Ill. The claim of this invention was published in our last week's list.

### BILLIARD TABLE.

This invention consists in constructing the pocket irons of billiard tables, so that they will yield to the force of the ball. The advantage of this improvement is that it prevents the billiard balls from leaping over the pocket irons when they are struck with great force. The pocket irons, in yielding, absorb the force of the balls, and causes them to drop into the pocket. Another advantage is that it saves wear and tear of billiard balls. In the usual style of billiard tables the pocket irons are stationary or unyielding, and the balls, from frequently entering with great force, soon cut through the leather covering and leave the iron naked, after which the balls, when entering the pocket, strike the exposed metal, and consequently are injured and rapidly destroyed. It is evident that, in a yielding pocket iron, the covering will not be near as much worn through in a given time as in a stationary one. Another advantage of this invention is that the outside of the pocket iron and of the rail of the billiard table present one continuous surface, and also that the top surfaces of the rail and of the pocket iron are on the same level. This construction gives to the billiard table a neat finish, hiding the attached edge of the pocket. It also allows of difficult "hazards" and "caroms" being played from the corners as well as from the sides of the billiard table. This is not the case with ordinary billiard tables, where the pocket irons have to be raised above the level of the rail in order to prevent the jumping of the ball over the packet. We can say with safety that this is an important improvement in billiards, since the renowned billiard-player, M. Phelan, has sanctioned it. The inventor of this improvement is James P. Ellicott, of Washington, D. C., who has assigned it to Michael Phelan and H. W. Collender, of this city. The claim of this invention was published in our last week's list.

TRIAL OF STEAM FIRE ENGINES.—On Monday the 7th inst., two steam fire-engines were exhibited in operation in the Park, in this city. One was manufactured by Silsby, Mynderse & Co., of Seneca Falls, whose engines were fully described and illustrated on page 129 of the present volume. It will be remembered that both engine and pump are rotary, and it would have been interesting to know the number of revolutions made in a minute; from the sound we should think they were to be counted by the thousand. The other engine was a reciprocator, the cylinders of the pumps and engine being in the same line. It was made by J. B. Johnson, of Portland, Maine. Both engines worked well, throwing large streams of water with remarkable constancy. It is evident that large fires are to be hereafter combated mainly by steam instead of muscular power.

ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING MAY 8, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

**18,139.—G. B. Arnold, of New York City, for an Improvement in Sewing Machines:**

I claim, first, A gathering and feeding mechanism, in two distinct parts, so constructed and operated that the gatherer takes hold of and moves the cloth up to the needle, leaving it immediately after the stitch is formed, or at the point where it is formed, and the feeder, properly so called, takes hold of and feeds the cloth after the seam is made.

Second, I claim the combination of the part, E J, with the part, B G, or their equivalents, operating together, substantially as described and for the purposes specified.

Third, I claim regulating the fullness of the gathers, by varying the relative throw of the feeding devices, substantially as described.

**28,140.—J. E. Atwood, of Bucksport, Me., for an Improvement in Pumps:**

I claim the combination of the main cylinder, J, with air-chamber, K, regulating screw, L, stationary chamber, D, valves, E and A, with the discharge-pipe, C, the whole operating in the manner and for the purpose set forth.

**28,141.—S. D. Avery, of Norwich, N. Y., for an Improvement in Windlasses:**

I claim the lever, H, provided with the pins, e f, and projection, g, and attached to the sleeve or collar, G, which is placed loosely on the shaft, B, in connection with the ratchet, E, attached permanently to the shaft, B, the pawl, F, and bearing, i, all arranged for joint operation, substantially as and for the purpose set forth.

[The object of this invention is to apply a brake to a windlass in such a manner that articles attached to the windlass and raised by it may be lowered with facility; the hitherto slow and tedious manual reverse movement of the windlass being avoided, and the invention at the same time admitting of the operator having complete control over the descending movement of the article being lowered. The invention is applicable to various purposes; its use in connection with wells may be mentioned as an instance, in which the buckets after being raised and emptied may be easily lowered, and their movement retarded at the proper time, so that they will not violently strike the water.]

**28,142.—W. J. Baker, of Dimock, Pa., for an Improvement in Seeding Machines:**

I claim, first, The arrangement of the wheel, G, having a toothed and blank periphery, spaced as described, the ratchet, H, adjustable shaft, E, provided with the pinion, b, and the crank pulley, c, connected with the seed slides, q, through the medium of the levers, t t, and rods, s s u w v, and used in connection with the spring, b, as and for the purpose set forth.

Second, The frame, H, provided with the seed-distributing devices and furrows and covering shares, when suspended to the axle, A, and used in connection with the mechanism employed for operating the seed slides, q' q', as and for the purpose specified.

[This invention relates to an improved seeding machine of the class employed for planting seed in hills and in check rows. The object of the invention is to place the seed-distributing device under the complete control of the driver, and insure the even planting of the seed in check rows.]

**28,143.—S. D. Baldwin, of Milwaukie, Wis., for an Improvement in Generators for Vapor Lamps:**

I claim placing the generator at right angles to the slit of the burner, and so attaching it to the end of the tube or generating chamber, as to allow of its being closer upon, or further from the top of the burner, and to be susceptible of being used as set forth.

**28,144.—E. E. Bean, of Boston, Mass., for an Improvement in Sewing Machines:**

I claim the arrangement and combination of the crotchet needle, F, thread carrier, I, and looper, H, consisting of the spring prongs, d d, operating in conjunction, as set forth.

**28,145.—C. B. Beeker, of Lancaster county, Pa., for an Improved Meat-chopper:**

I claim the specific arrangement of the adjustable ring, L, hoisting rack, and handled ratchet Rr S, for raising the choppers, binding nut and handle, T, in combination with the sliding braces, g g, and attached cross-pieces, F G, constructed in manner and for the purpose described.

**28,146.—David Bedell, of Seneca Falls, N. Y., for an Improved Gate Pulley:**

I claim the reversible extension bar, E, which bears the fulcrum pulley, H, constructed and arranged in combination with its frame, or support, A, and in relation to the stationary pulley, G, and gate or door, D, substantially as and for the purposes specified.

**28,147.—C. T. Boardman, of Bergen Point, N. J., for an Improvement in Making Sheet Metal Pipe:**

I claim the employment or use of the rollers, B C C, when used in connection with a removable "former," and while the sheet metal is bent, substantially as and for the purpose described.

I further claim, in connection with the rollers, B C C, the brake or locking bar, E, and the pipe support, G, arranged to operate as and for the purpose set forth.

**28,148.—G. C. Bovey, of Chillicothe, Ohio, for an Improvement in Automatic Draw Bridges for Canals:**

I claim the combination of arrangements, by which the draws of the bridge are opened, re-adjusted and secured, substantially as delineated and described, the whole working as shown in model and drawings.

**28,149.—J. L. Bridge and W. B. Lodge, of Vernon, N. Y., for an Improvement in "Formers" for Forming Seamless Felt Caps:**

We claim the employment or use of a flexible or sectional "former" R, constructed so as to be capable of being elongated or transformed from an oblate to a prolate spheroid, substantially as and for the purpose specified.

**28,150.—S. B. Broad of New York City, for an Improved Life-saving Raft:**

I claim a life-raft constructed as described, by forming it of three or more flexible and inflatable waterproof pontoons, each incased by a cage or network of rope, in combination with a flexible deck, bound and braced by rope, as described, and cross spars arranged to block with the cages of the pontoons, and the whole being lashed and united together, essentially as and for the purpose or purposes set forth.

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### 28,151.—Stephen Burrows, of Whitewater, Wis., for an Improvement in Rice and Clover Hullers:

I claim the combination of the revolving inclined bolting cylinder, D, supported in the frame, J, as described, with the thrashing cylinder, B, when the said bolting cylinder is driven by the frictional contact of the shaft, b, the whole being constructed and operating as described.

Second, The combination of a concave, C, which has parallel sides, pins, c c, which gradually diminish in length from the receiving to the discharging end of the machine, and the conical cylinder B, having teeth, d d, of gradually diminishing length, placed spirally on its circumference, in such manner that the degree of the spirals decreases as the teeth approach the discharging end of the cylinder, substantially as and for the purposes set forth.

[This invention consists in a peculiar construction of the threshing cylinder with respect to the concave, and to the manner of arming the said cylinder with spikes, by which the chaff is kept in a packed state during the entire passage through the machine, or rather while it is being threshed—the space between the cylinder and concave being diminished in proportion as the bulk of the chaff is reduced.]

### 28,152.—Wm. A. Bury, of Grosse Isle, Mich., for a Bill of Fare:

I claim the application of a series of rings (independent and adjustable) to a changeable bill of fare, as described.

### 28,153.—Jacob Busser and J. B. Harmer, of Philadelphia, Pa., for an Improvement in Machinery for Propelling Railroad Cars, &c.:

We claim the levers, o o, c c, c′ c′, in connection with the crank wheels, k k, the spur wheels, f f′, and the pinions, g g′, or their equivalents, the whole combined substantially in the manner set forth and for the purposes specified.

### 28,154.—James Calkin and P. A. Hover, of Hudson, N. Y., and C. W. Grannis, of Gowanda, N. Y., for an Improved Furnace for the Combustion of Coal Oil and similar Hydro-carbon Fluids:

We claim the fuel pan in combination with the chamber pan, and both constructed and arranged substantially in the manner and for the purpose set forth.

### 28,155.—D. M. Church and C. H. Ellsworth, of Birmingham, Conn., for an Improvement in Bosom Expanders:

We claim a bosom expander, composed of strips, A B C, hooks, b b c, loops, d, and otherwise made as shown and described.

[This invention consists in a peculiar arrangement of bones, cane, whalebone, metal, or other suitable flexible strips, united together so as to form a convex heart-shaped frame, covered with any suitable material so as to possess elasticity and flexibility, and provided with suitable hooks and loops for attaching the same to the body.]

### 28,156.—J. H. Clark, of Westbrook, Maine, for an Improvement in Wringing Clothes:

I claim the employment and use of the adjustable slide, H, with its friction holder, W, in combination with the twisting friction holder. W′, in its combination with A and F, substantially as and for the purpose set forth.

### 28,157.—Loring Coes and A. G. Coes, of Worcester, Mass., for an Improvement in Rolling the Shanks and Bars of Screw Wrenches:

We claim, first, A pair of cut-away rolls having a pair of grooves formed in them, as described, and when said grooves incline in contrary directions to each other, in such a manner that the fin formed in one shall be rolled down in the other, substantially as set forth.

We also claim, in combination with a pair of rolls having inclined grooves in them, as set forth, a guide bar in rear of said rolls with inclined openings corresponding to those between the grooves, for the purpose of preventing the bar from turning in said grooves, as set forth.

### 28,158.—Ernst Constantine, of New York City, for an Improvement in Apparatuses for Evaporating Liquids:

I claim the rapid evaporation of saline and other liquids by means of spouts or fountains, constructed in the manner and for the purpose substantially as described.

### 28,159.—H. J. Coster, of Chicago, Ill., for an Improved Rocking Chair:

I claim combining with a rocking chair, a fan acting automatically by means of spring, P, in the rocker, Y, cord, Z, pulley, K, spring, M, rod, F, all arranged substantially as and for the purpose specified.

### 28,160.—Andrew Crow, of Middlefield, Mass., for an Improvement in Rifle Canes:

I claim the combination of a walking stick with a pistol or rifle barrel, when the explosion of the percussion cap or cartridge is effected by atmospheric pressure, substantially in the manner set forth.

### 28,161.—J. E. Crowell, of Chelsea, Mass., for an Improvement in Machinery for Spinning Yarn:

I claim, first, The combination with the geared rollers, A, and revolving flanged casing, B, of a stationary box, D, which has its inner circumference screw-threaded, and incloses the geared rollers and casing, and serves for insuring the turning of the rollers vertically during their movement with the casing horizontally, substantially as and for the purposes set forth.

Second, The combination of the revolving draw-head casing, B, with a box made in two parts, D and E, in order that, on taking off the top of the box, the casing with the rollers and gear wheels can be got at or removed when out of repair, while dust is effectually excluded from the roller gear wheels by having the top closed upon the box when the machine is operated, substantially as set forth.

### 28,162.—Lyman Derby, of New York City, for an Improvement in Locks:

I claim, first, The use of the screw, K, and nut, L, having a pin or shoulder, N, on the side of it, in combination, substantially as described and for the purposes set forth.

Second, I also claim the use of the axis, F, having a shoulder, d′, on its outer end, and an adjustable cap plate, G, on its inner end, in combination, substantially as and for the purposes set forth.

Third, I also claim the use of the stem, H, thumbscrew, I, and knob, J, or equivalents, in combination, substantially as described and for the purposes set forth.

Fourth, I also claim the use of the hollow axis, B, in combination with the axis, F, and knob, J, substantially as described and for the purposes set forth.

Fifth, I also claim the use of the tumbler barrel or case, A, in combination with the hollow axis, B, and screw, K, substantially as described and for the purposes set forth.

Sixth, I also claim the use of the tumblers, O and O2, made substantially as described, in combination with the screw, K, and nut, L, for the purposes set forth.

Seventh, I also claim the use of the reversal guides on the interior of the barrel, A, in combination with the tumblers and nut, L, substantially as described and for the purposes set forth.

Eighth, I also claim the use of the latch pin, R, and detent spring S, or equivalents, in combination with the barrel or case, A, and nut, L, substantially as described and for the purposes set forth.

### 28,163.—J. C. Dickey, of Saratoga Springs, N. Y., for an Improvement in Machinery for Crushing Quartz, &c.:

I claim the employment of a revolving cone on a stationary cone, made sufficiently high to form a mortar on the top of the stationary cone, in combination with a stamper or stampers working in the said mortar, for the purpose of crushing, grinding and pulverizing quartz rock containing gold, in the manner and for the purpose set forth.

### 28,164.—C. A. Dubs, of Natchez, Miss., for an Improvement in Hoop Locks for Metal Bale Hoops:

I claim the combination of the three prongs, e e f, with the hoop end, B, and plate, C, as and for the purpose shown and described.

[The object of this invention is to obtain a hoop lock that will firmly secure the two ends of a bale hoop together without weakening the hoop by the formation of the lock, so that the bale hoop at the lock, and at points adjoining, will be equally as strong as at any other point.]

### 28,165.—Selah Dustin, of Detroit, Mich., for an Improvement in Alarm Valves for Steam Boilers:

I claim so combining with an elevated or separate chamber, into which water or steam may flow from the boiler through a suitable pipe or passage, as the water line in the boiler rises above or falls below a given hight, a float and valve, or a float and valves, as that the float shall, by its upward force, when said chamber is supplied with water, close said valve or valves and act by its gravity, when unsupported by water, in conjunction with the steam in that case in the chamber, in opening said valve or valves to allow the escaping steam to ring a bell, blow a whistle or sound an alarm when the water is too low in the boiler, substantially as described.

### 28,166.—R. H. Ewing, of Nicollet county, Minn., for an Improved Rocking Chair Convertible into a Cradle:

I claim attaching the upper part of the chair to a swivel bed by means of bar hinges, in combination with the swivel bed attached to the rocker truck by means of a pin, in the manner described and for the purposes set forth.

### 28,167.—C. W. Flippen, of Laurel Grove, Va., for an Improvement in Hydraulic Presses:

I claim, first, Combining the piston of a hydraulic or tobacco press with a disk, the bore of which is of the same diameter as the piston, and with a cylinder, the hollow space of which is of a larger diameter than the piston, substantially as and for the purposes set forth.

Second, In the retainers of tobacco presses, combining one of the retainer bolts with a lever and swivel joint on top of said bolt, for the purpose of keeping the top retainer plate suspended, or raising it when necessary, substantially as set forth.

[This invention obviates the necessity of boring the cylinders of hydraulic presses. It also enables the operators of such presses to manage the pressure retainers with greater facility. The cylinders of hydraulic presses used for pressing tobacco are very heavy and unwieldy, and on account of their size and weight—amounting to several tuns—the boring of these cylinders is attended with many difficulties, and is consequently very expensive. Now, by making the inner diameter of the cylinder head and cylinder of a larger diameter than the piston, and inserting and packing a guide ring under the piston head, the same bored true to fit the piston, the necessity of boring the cylinder and cylinder head is obviated. The pressure retainers which are at present in use are rather slow and tedious to operate, on account of nuts and screws being employed both for raising and lowering the platen. Now, by having the platen fitted loosely over the screws, and employing a pivoted lever, the upper platen or retainer plate can, in an instant, be elevated from the pressed tobacco or brought down with equal speed upon the new pile of tobacco. We regard this as a capital arrangement.]

### 28,168.—N. S. Gilbert, of Albion, N. Y., for an Improved Method of Feeding the Bolt in Shingle Machines:

I claim the arrangement of the pawls, i i, racks, j j, holding pawls, p p, levers, O O, and wheels, N, provided with the projections, f, for the purpose of feeding the bolt to the knife, as set forth.

[This invention consists in the employment or use of an oscillating knife frame, arranged in a novel way, and also in using, in connection therewith, a peculiar bolt-feeding mechanism, whereby the "work" is cut from the bolt with a smooth, clean cut, and the bolt fed to the knife either parallelly or obliquely therewith, as the nature of the work may require.]

### 28,169.—J. H. Gooch, of Oxford, N. C., for an Improvement in Plows:

I claim making the moldboard extension in two parts, A and B, the dividing line between the two parts, A and B, being horizontal, or nearly horizontal, for the purpose of transforming the plow into a cultivator, subsoil or complete turning plow, by simply detaching either one or both of those two parts, substantially as set forth.

[This invention consists in a moldboard extension made in two parts, and used in connection with a plow, in such a manner that it serves for transforming the plow into a cultivator, subsoiler or complete furrower. This is a simple and ingenious plow, and we have no doubt but that it will answer well for turning-up our Mother Earth in almost any manner desired.]

### 28,170.—W. B. Gordnier, of Cowdersport, Pa., for an Improved Churn:

I claim the combination with the vibrating frame, C, carrying the churn, E, of the arms, F F′, and spiral plate, G, cord, K, pulley, J, and treadle, L, all being arranged and operating in the manner and for the purposes set forth.

[The object of this invention is to combine with a swinging motion given to the churn-box, a semi-rotary motion of the churn-dasher, at the same time to effect this with very little expenditure of labor and in a convenient manner. The invention consists in hanging the churn-box, dasher and dash-rod in a swing, and operating the swing by means of a treadle, so as to give to the churn a pendulum motion and the dash-rod a reciprocating and rotary motion.]

### 28,171.—Charles Harvey, of Richmond, Ind., for an Improvement in Apparatuses for Evaporating Sugar Juices:

I claim the hinged pans, D E, arranged substantially as described, and for the purpose set forth.

### 28,172.—G. E. Hayes, of Buffalo, N. Y., for an Improvement in Thermometer Cases for Steam Boilers:

I claim making the case and the part of the thermometer in which the mercury tube is packed in one piece, and screwing the said piece on to a socket, D, or its equivalent, which secures the thermometer to the boiler or steam apparatus in such manner as to compress the packing and make a steam tight joint round the tube, substantially as specified.

And I also claim the bow, m, with cam-like ends applied to a valve, i, in the socket, D, or its equivalent, in combination with a spring, j, substantially as and for the purpose specified.

### 28,173.—R. J. Hill, of Americus, Ga., for an Improvement in Machines for Sowing Fertilizers:

I claim the arrangement of the revolving hooks, e e, and small hoes, B B, the sliding plates, C and D, to regulate the openings, and the sliding rod and bearing on the shaft to connect and disconnect the pinion, g, with the wheel of the cart as specified, for the purposes set forth.

### 28,174.—Henry Hochstrasser, of Philadelphia, Pa., for an Improvement in Moldings for Hanging Pictures:

I claim a molding with a projecting lip or rabbet, A, or its equivalent, substantially as and for the purposes as described.

### 28,175.—Wm. Hoffman, of Solano county, Cal., for an Improved Frog for Bayonet Scabbards:

I claim making the frog of the bayonet scabbard in two parts, as described, when the said parts are united together by a bolt, or other equivalent device, substantially in the manner and for the purpose set forth.

### 28,176.—Birdsill Holly, of Lockport, N. Y., for an Improvement in Sewing Machines:

I claim, first, Constructing the machine, so that, by means of the hollow bearing shaft, C, or its equivalent, it may be turned on the axis of the driving pulley, B, for access to the parts below the table without unbanding the pulley, substantially as set forth.

Second, I claim the method of setting or adjusting the needle by turning the swivel tubular bearer, E, in the posts, D D, substantially as shown and described.

### 28,177.—R. G. Holmes, of Worcester, Mass., for an Improved Churn:

I claim my improved churn, having its several parts constructed and arranged in relation to each other, and so as to operate together substantially as shown and described.

### 28,178.—Jacobs Hovey, of Bedford, Mich., for an Improvement in Hame Tugs:

I claim the combination and arrangement of the box, A, spring, B, pin, a, slide, C, tug, D, and sliding loop, E; the loop being made adjustable upon the box, so that the back and belly straps will have an automatic adjustment; the several parts being connected and used substantially as and for the purpose specified.

### 28,179.—J. M. Hunter, of New York City, for an Improvement in Machines for Cutting Fat:

I claim, first, Slicing the fat by the cutter, G, which is rotated and moved vertically at the same time, as set forth.

Second, In combination with the rack, K, and pinion, J, or their equivalents, operating G by the ratchet and pawl, G′ T, or their equivalents, so as to act with a positive motion during the entire descent and to release G during the ascent, as described, to avoid losing time and power in overcoming the momentum of the cutting disk, and for the purpose of clearing off the material without increasing the labor of operating.

Third, The adjustable frame, E, as described, in combination with the pinion, J, and fixed rack, K, or their equivalents, for lowering the shaft, g, as the disk becomes smaller, without affecting any of the other portions of the machine.

Fourth, The flaring of the trough, B, as described, for the purposes set forth.

Fifth, Operating the cutting disk by the combination of a heart cam motion, with a rack and pinion motion, substantially as and for the purposes set forth.

Sixth, Sharpening and truing the cutting disk, while in operation, by means of the adjustable surfaces, N and N′, arranged substantially as set forth.

### 28,180.—C. L. Ingraham and Emery Rounds, of Berlin, Wis., for an Improved Washing Machine:

What we claim is not the pump on the wheel separately, but the combination of the pump as arranged with the wheel or cylinder, which has a slatted or open periphery, the two being so arranged and connected that the water will be raised from the box by the pump, and injected upon and among the clothes through the open periphery of the cylinder as it revolves, substantially as specified.

### 28,181.—E. T. Ingalls, of Haverhill, Mass., for an Improved Machine for Burnishing the Edges of Boot and Shoe Soles:

I claim, first, Subjecting the edge of the sole and heel of the boot or shoe, caused to travel and guided in a fixed path, either by machinery or by hand, to the action of a burnishing tool, either held stationary or having a vibrating or other proper motion communicated to it by any suitable arrangement of mechanical devices, as set forth.

Second, Producing an elastic yielding motion to the burnishing tool, both in a vertical and lateral direction, by means substantially as described.

Third, So arranging the tool stock that the tool can be set at any desired angle, so as to conform to any shape and bevel of the edge of the soles and heel, as described.

Fourth, So hanging the tool stock that it can turn in its bearings, whereby the tool will conform to the curves and elevations and depressions of the different portions of the sole and heel, and therefore prevent its cutting into and defacing the same as would otherwise be the case.

### 28,182.—J. L. Jullion, of Aberdeen, Great Britain, for an Improvement in the Preparation of Paper. Patented in England, Nov. 9, 1858:

I claim, first, The use of compounds, prepared by precipitation, from watery or other solution of the earths and acids before mentioned, to consolidate and harden paper.

Second, The use of chloride or oxy-chloride of zinc with glutinous matter, as a size for paper; and—

Third, The use of any of the before-mentioned prepared inorganic bodies, mixed with the sizing agent, to facilitate the absorption of writing and printing ink.

### 28,183.—Charles Kinzler and Wilhelm Rosebrock, of New York City, for an Improved Apparatus for Cutting or Dividing Loaf Sugar:

We claim, first, The combination and arrangement, with circular saws, of the revolving frame, B, provided with arms, n and m, operating in such a manner as to take hold of a loaf of sugar, carry the same through the saws, and deposit the cut slabs upon a suitable table, substantially as specified.

Second, We claim the arrangement of attaching the eccentric groove, E, to a movable lever, operating in the manner described and for the purpose set forth.

Third, We claim the manner of working the revolving finger frame, B, by means of the clutch, K, acted upon by the lever, L, in the manner and for the purpose substantially as described and specified.

### 28,184.—Henry Knight, of Jersey City, N. J., for an Improvement in Molds for Molding Cement Pipes:

I claim, first, The combination of the stationary core, B, mold, F, with base, E b, and hinged table, C, constructed and arranged for joint operation in the manner and for the purpose described.

Second, The stationary core, B, and mold, F, having the enlarged top, d e f, and base, F b, in combination with hinged table, C, and detachable collar, G, in the manner and for the purpose substantially as specified.

### 28,185.—M. R. Lemman, of Columbus, Miss., for an Improvement in Machinery for Felting Hat-bodies:

I claim the placing of the rollers, C C C′ C′, eccentrically on their axis, a, substantially as shown and described, so that said rollers will act or press alternately in pairs on the article between them, for the purpose set forth.

[The object of this invention is to render the rollers far more efficient than hitherto, by giving them an eccentric movement during their rotation, and so arranging their driving mechanism as to admit of a rapid speed.]

### 28,186.—John Lightfoot, of Cold Spring, Ky., for an Improved Door-fastener:

I claim the combination of the plates, A and B, hinged bolt, C c, and spring, d; the whole being constructed, arranged and operating substantially as and for the purposes set forth.

### 28,187.—Wm. S. Loughborough, of Rochester, N. Y., for an Improvement in Iron Ties for Cotton Bales:

I claim the construction of iron ties, substantially as and for the purposes specified.

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### 28,188.—G. F. Lufbery, of New York City, for a Machine for Making Paper Bags:

I claim, first, The cylinder, D, constructed with bands and fillets, D1 D2 D3, and furnished with grippers, substantially as described, to perform the several operations of taking the blank from a pile and conveying it toward the lap-folding apparatus, and of pasting the laps and printing it while on its way to such apparatus.

Second, The grippers, i i, applied and operated by stationary arched plates, H H, in combination with springs, k k, substantially as described.

Third, The pronged fly, Q, applied and operating in combination with cylinder, D, to strip the pasted blank from the pastefillets of said cylinder, substantially as described.

Fourth, The arrangement of the folding table, S, and lap-folders, T T, the fly, Q, and the pasting and printing cylinder, D, substantially as described.

Fifth, The fly, W, applied in combination with the folding bed, S, in the manner and for the purpose specified.

Sixth, The stationary curved needle, applied and operating in combination with a hole in the fly, W, or its equivalent, by which the bags are thrown out of the folding apparatus, substantially as and for the purpose specified.

[This invention consists in certain novel contrivances which take a cut and partly-folded blank from a pile, print it, paste the parts which are to form the lap, and convey it toward the apparatus by which the lap is folded; also, in a certain novel arrangement of the lap-pasting apparatus and the contrivance for conveying the partly-folded blank to the lap-folding apparatus; also, in the arrangement of a fixed needle, in such relation to the apparatus by which the finished bag is thrown out of the folding apparatus that the bags will be strung together by the act of throwing them out of said apparatus.]

### 28,189.—A. W. J. Mason, of New Orleans, La., for an Improved Machine for Drying Sugar:

I claim combining a spout, B, drum, C, and slides, F G E, with a revolving fan or beater, D, and automatic ventilating valves, H H, substantially as and for the purposes set forth.

[This invention consists in arranging a revolving shaft, furnished with narrow radial arms or wings, in a stationary hot-air cylinder or drum, which is heated by steam. The sugar is allowed to fall periodically from a hopper into the cylinder, on to the wings, and as the wings revolve, it is broken up finely and allowed to fall through the hot-air into a receiver at the bottom of the drum. The machine is so constructed that the sugar is fed in, beaten up and dried before it escapes; and as soon as it escapes, the impure air in the drum is allowed to float off, and fresh air supplied in its place. This is a very complete machine for drying sugar, corn and other substances.]

### 28,190.—C. A. McEvoy, of Richmond, Va., for an Improved Bolt for Car Seats:

I claim a portable self-fastening bolt, constructed as described, in combination with a detachable pin, as and for the purposes set forth.

[The advantage of this improvement is that a single bolt to each car seat will answer for locking the back of the seat in either of the two positions it usually occupies when a train is traveling toward and from a station; and the utility of the invention lies in this, that the conductor of the train can fasten the backs of all the seats in one condition, and carry the key pin with him; and, when necessary, can unfasten any of the bolts, and turn the backs of the seats. The passengers cannot do so; and thus the serious annoyance of a passenger placing his feet on the cushion of a seat opposite him, or otherwise monopolizing more than his allotted space, is prevented. This is certainly a neat, cheap and useful contrivance.]

### 27,191.—John Neff, Jr., of Pultney, N. Y., for an Improvement in Cultivators:

I claim the arrangement of the crankshaft, H, the handles, I, couplings, K, springs, J, supports, L, cross piece, M, and screws, P, constructed and operating as described for the purpose set forth.

### 28,192.—Reuben Nickerson and A. B. Colton, of Athens, Ga., for an Improvement in Valve Cocks:

We claim the flanged nut, F, fitted and applied to the socket, c c, and secured by the screwed cap, E, substantially as described.

[This invention consists in a novel and very simple mode of applying the nut in which the screw thread on the valve stem works, which affords very great convenience for grinding the valve whenever necessary, and possesses other advantages over other modes in present use.]

### 28,193.—Walter Peck, of Rockford, Ill., for an Improvement in Pumps:

I claim, first, Coupling the lower end of the pump to a fixed stand, P, or its equivalent, by means of a universal joint, substantially as described, for the purpose set forth.

Second, In combination with the moving rod or pipe, a, the stationary collar, e, and sliding collar, f; the whole arranged and operating substantially as described, for the purpose set forth.

### 28,194.—T. W. Porter, of Bangor, Maine, for an Improved Shoe Plate:

I claim the concave plate or cork, as described.

### 28,195.—Wm. S. Pratt, of Williamsburgh, N. Y., for an Improvement in Anti-friction Journal Boxes:

I claim the use and application of the rollers, a a a, placed within the rollers, A A, and revolving around the fixed axis, E, substantially as and for the purposes set forth.

### 28,196.—F. B. Richardson and B. L. Richardson, of Boston, Mass., for an Improvement in Enema Syringes:

We claim our improved manufacture of elastic bulb enema syringes, as made by combining an elastic bulb, A, two long flexible induction and eduction pipes, B C, and two separate valve chambers, K F, with a three-fold separate connector, I, for connecting the elastic bulb and flexible pipes.

### 28,197.—Elijah Robertson, of Hartford, Conn., for an Improvement in Potato-diggers:

I claim the application and arrangement of the inclined crag or finger wheel, D, for the purpose specified, in combination with the share, B, the serrated mold board, A, the vertical side driving wheel, E, and pinion, G, in the manner and for the purpose substantially as set forth and described.

### 28,198.—D. B. Rogers, of Pittsburgh, Pa., for an Improvement in Cultivator Teeth:

I claim attaching the bolt by which the tooth is secured to the beam to the shank of the tooth, by wrapping the shank around it and passing a portion of the shank, together with the bolt, into the beam, in combination with the shoulder and stay point, formed out of the upper end of the shank, substantially in the manner described, for the purpose of attaching the tooth to the beam of a cultivator.

### 28,199.—Octave Saulay, of New Orleans, La., for an Improvement in Lamps:

I claim the combination of the dome, H, constructed with spiral chambers, L L L, through which the air is circulated and heated with a lamp, arranged as described, for illuminating the apartment; the lamp and its mountings being used to illuminate, warm and ventilate, substantially as set forth.

### 28,200.—A. M. Sawyer, of Athol, Mass., for a Mode of Applying Steam to Propellers:

I claim a propeller, having passages and orifices for the passage of steam, for the purpose of causing the same to revolve under water, as described.

### 28,201.—S. J. Seely, of Albany, N. Y., for an Improvement in Gates for Canal Locks:

I claim, first, The use of corrugated metal plates, to form the body of the lock gate, for the purpose of giving to the gate increased strength, without unduly increasing its weight, as described.

Second, Forming of the corrugated spaces of the lock gate, air chambers, as set forth, to give buoyancy to the gate to allow it to be operated with a small amount of power, as described.

### 28,202.—Bezaleel Sexton, of Albany, N. Y., for an Improvement in Machinery for Drying Cloth:

I claim the arrangement of the perforated segment plate connected with the blowing apparatus, in combination with the wheel armed with tenter hooks, or their equivalents, and the rollers, or their equivalents, for introducing the cloth, to make part of a hollow cylinder and for drawing-off the cloth when dry, substantially as described.

### 28,203.—Samuel Shadbolt, of Scottsville, N. Y., for an Improvement in Stoves:

I claim the particular arrangement or combination of the fire-pot described, with the smoke flues, d d, and air tubes, e e, as set forth and described.

### 28,204.—M. A. Shepard, of Parkersburgh, Ill., for an Improvement in Floating Sluices for Mill Races:

I claim a sluice or race, B, supported on a running stream by means of suitable floats or boats, C, and fitted between upright guides, E, substantially as and for the purpose set forte.

I also claim, in connection with the sluice or race, B, a vertical shaft, G, connected either directly or indirectly with the water wheel, and made to pass loosely through the power pulley, H, to admit of the rising and falling of the shaft, G, with the wheel and race without affecting pulley, H.

[The object of this invention is to obtain, from running streams and without a dam, a head and fall of water for driving machinery, and, at the same time, obviate the difficulty hitherto attending the varying hight of the water. The invention consists in the employment of a floating race, in connection with a water wheel or water engine, to effect the desired end.]

### 28,205.—S. H. Sill, of Geneva, N. Y., for an Improvement in Gates:

I claim, first, The combination of the levers, L and L', with the cam, C, formed and arranged with reference to the gate substatially as described, whereby the gate is elevated, disengaged from the cam stop and fastenings, partially revolved and disengaged from the lever, substantially as set forth.

Second, The arrangement, with the above, of the cam, C', and the standards, S, substantially in the manner and for the purpose set forth.

### 28,206.—G. W. Slough (assignor to E. Ball), of Canton, Ohio, for an Improvement in Making Guard Fingers for Harvesters:

I claim forming the blank guard (as shown in Figs. 11, 13 and 15) from a section of a bar or piece of wrought iron (as shown in Figs. 4, 6 and 8), by the mode or process substantially as described, whereby the shank, g, shoulder, f, surface, k, and lip, j, of each guard, are formed with precision and celerity, while a sufficient amount of metal is reserved at the point, h, to form the point of the guard.

### 28,207.—A. E. Smith, of Brouxville, N. Y., for an Improvement in Making Axle Boxes:

I claim a new and useful improvement in the manufacture of malleable iron axle boxes, by means of the operations described, and for the purpose of producing an article cheaper, more expeditiously, and of a better and more useful kind than heretofore known.

### 28,208.—David Snedeker, of New York City, for an Improvement in Tools for Opening Barrels:

I claim the combination of pivoted rack plate, D, with the sliding adjustable claw plate, B', and lever, B, substantially as and for the purpose set forth.

I also claim making a slot in the end of rack plate, D, and in the use of a spring, g, arranged between jaws, b b, as set forth, and the novel construction of the parts, whereby they may be locked closely to the handle, as described and represented.

[The nature of this invention consists in applying to a hammer handle, or to a simple bar of wood or iron, a slotted and pointed rack bar with an adjustable claw. The implement may be conveniently used for drawing off the end hoops of barrels, casks, &c., or for loosening the middle hoops, drawing out nails, and opening the heads of barrels; the parts being so arranged and applied that they may be locked closely to the bar, lever or hammer handle, to whichever they may be applied, when not in immediate use.]

### 28,209.—G. A. Stanley, of Cleveland, Ohio, for an Improvement in Candle-molding Apparatus:

I claim the special arrangement of the slide, C, and upper and lower pieces, H H', and lever, D, when operating conjointly, in the manner and for the purpose specified.

### 28,210.—G. A. Stanley, of Cleveland, Ohio, for an Improvement in Candle Mold Boxes:

I claim the special arrangement of the upper section, B, with the candle molds, when operating conjointly and in the manner specified.

### 28,211.—George Stevenson, of Zionsville, Ind., for an Improvement in Apparatuses for Evaporating Liquids:

I claim the rotating shaft, D, the adjustable perforated blades or skimmers, F, and the springs, b, constructed and operating in combination with the partitioned pan, B, substantially as described.

### 18,212.—O. S. Squyer, of West Dresden, N. Y., for an Improvement in Compensating Spring Balances:

I claim the metallic spring endless ring, A, in a circular or oval form, with the graduated arm or bar, B, hooks, C C', and rings, D D', constructed and operated as substantially set forth.

### 28,213.—J. W. Strange, of Bangor, Maine, for a Self-protecting Dress Hook:

I claim my self-fastening dress hook, as described, with the axle or shaft, c c, the wings, W W, the recovery spring, S, the curved pins or hooks, h h, and the perforated flanges severally marked "1," and upon the wings, W W, or if said dress hook be formed or made in any manner substantially the same.

### 28,214.—R. R. Taylor, of Reading, Pa., assignor to the Bordentown Machine Company, for an Improvement in Furnaces:

I claim, first, The foundation plates, G and G', with their retaining ribs, the side plates of the furnace with the vertical ribs, and the bars, H, with their vertical recesses; the whole being arranged and adapted to each other and applied to the brickwork of a furnace, substantially as and for the purpose set forth.

Second, I claim the detachable plates, n, adapted to the lugs, x x, on the side plates, and arranged, in respect to the openings on the same, in the manner and for the purpose specified.

Thirdly, The box, K, carrying the ash-pit door, and connected to the foundation plates, G and G', by bolts, q q; the whole being arranged as set forth, for the purpose specified.

### 28,215.—E. D. Thomas, of Rochester, N. Y., for an Improved Washing Machine:

I claim, first, The arrangement of the pinion upon the power shaft, the double-toothed or ratchet bar, the levers, and the spring for giving the traverse to the box, as described; and, in connection therewith—

Second, I claim the arrangement of the pounders having the spring yoke connection set forth, and attached to the main shaft by the cranks placed at right angles to each other, as described.

### 28,216.—G. W. Tolhurst and D. C. Sartwell, of Liverpool, Ohio, for an Improvement in Dumping Wagons:

We claim the combination of the adjustable partitions, L L L L sliding crosspiece, D D D D, and side leaders or connections, H H H H; the whole being arranged and combined for operation as described and set forth, not confining ourselves to the number or size of the compartments which contain the manure.

### 28,217.—J. R. Turner, of Jacksonville, Ill., for an Improvement in Seeding Machines:

I claim, first, The combination of a rotary, corrugated, seed-distributing shaft, f, swinging or regulating plate, h, and a gage plate or cut-off, G, placed within a seed box, A, and arranged to operate as and for the purpose set forth.

Second, The combination of two seed-distributing devices as above, when placed in a seed box, A, divided into two compartments by a partition, g, and placed on a plow or cultivator frame—the whole being arranged, substantially as described, to admit of the sowing of seed or grain broadcast or in drills, alternately from one mode to the other, as may be required while the machine is in operation, for the purpose specified.

Third, The general arrangement of the seed box, A, beam, B, handles, C C, and wheel, D, as shown and described, whereby the wheel and seed box are allowed to rise and fall independently of the beam, and the working parts prevented from being disarranged or injured by any irregular movement of the plow, and the flow or discharge of the seed or grain rendered more uniform than it otherwise would be.

[This invention is more especially designed for sowing wheat or other grain or seed among standing corn, and to sow the grain or seed either broadcast or in drills, alternating, if necessary, from one mode to the other, at the will of the operator and as the nature of the ground may require.]

### 28,218.—Alexander Van Valkenburgh, of Griffin's Corners, N. Y., for an Improvement in Ox Shoes:

I claim, first, The strapped shell, M N, with its inclined heel flanch, B, and a supporting heel link combined and arranged to form an ox shoe possessing the qualities described, and—

Second, Uniting and sustaining the two strapped shells, M N M N, by the double link, E, and strap and buckle, G H, or their equivalent, substantially in the manner set forth.

### 28,219.—G. H. Van Vleck, of Buffalo, N. Y., for an Improved Churn:

I claim the arrangement of the churn box, the dashers and staff, and the adjustable hinged board, C; the bottom of the box being provided with pins for adjusting the board, and said board being provided with openings the edges of which present different angles to the cream, as the position of the board is changed with reference to the sides of the box, substantially as and for the purpose specified.

### 28,220.—Edmund Victory, of Watertown, Mass., for an Improvement in Machinery for Spinning Yarns:

I claim, first, The mechanism described, or its substantial equivalent, for regulating the draft and of adjusting the hold of the draw and feed rollers on the fiber, for the purposes set forth, whereby the distance between the draw and feed rollers is rendered adjustable and controllable, whether while the machine is in motion or not, and without discontinuing the roving, substantially as specified.

Second, The general construction and arrangement of parts of a draw head as combined with its discoidal shield, substantially in the manner and for the purposes set forth.

Third, Constructing the circular stationary rack in two parts, and attaching the one of said parts to the cap of the draw head standard, to facilitate the removal of the draw head, substantially as specified.

### 28,221.—S. W. Warren, of Brooklyn, N. Y., for an Improvement in Hose Coupling:

I claim the hollow key seat, 4, across the coupling, b, receiving the key, c, that connects the parts, b and a, in the manner substantially as specified.

### 28,222.—Morris Wells, of Brooklyn, N. Y., for an Improvement in Making Kettle Ears:

I claim the kettle ears constructed in the manner set forth, forming a new article of manufacture.

[This invention has for its object the manufacturing of kettle and bucket ears in a neat and handsome style, with little trouble, and of refuse scraps of tin, such as are usually thrown away as useless for any purpose. They are given the requisite strength, durability and stiffness, and answer the same ends as those that are stamped from thick sheet iron and then finished up.]

### 28,223.—Charles Weston, of Salem, Mass., for an Improved Method of Hanging Reciprocating Saws:

I claim the employment or use of two gates, B B, placed one in front of the other and connected by suitable pitmen, C C, to cranks, D D, having reversed positions relatively with each other and formed on the same driving shaft, E, substantially as and for the purposes set forth.

[This invention consists in the use of two reciprocating saw gates placed one behind the other, between suitable guides, and operated by pitmen from reverse cranks on a driving shaft, whereby the saws are made to run with a more equable movement than hitherto, and, consequently, rendered capable of being driven with greater speed.]

### 28,224.—Aloys White, of New Haven, Conn., for an Improved Musical Instrument:

I claim a musical instrument composed of a series of springs, b, attached to a sound board and a series of keys and suitable mechanism in combination therewith, for playing upon the said springs.

I also claim the fly lever, D, fly, E, and let-off lever, F, applied in combination with each other and with the key, C, and stationary ledge, g, to operate substantially as described.

And I further claim the arrangement of the damper in combination with the spring, b, and the fly lever, D, substantially as described.

[This invention consists in a musical instrument composed of a series of metal springs such as are used to produce the musical sounds in what are known as musical boxes, attached to a sound board, and a series of finger keys and suitable mechanism in connection therewith for playing upon the said springs.]

### 28,225.—E. H. Wheeler, of New Orleans, La., for an Improvement in Apparatuses for Defecating Cane Juice:

I do not claim as new the use of the centrifugal drum or wheel or the retort in which the sulphur is burned, or the oil joint connecting the same; but what I do claim as new and useful, is:—The combining these several agents by which I produce a thorough and complete dissemination of the sulphurous gas or sulphurous acid gas in the cane juice.

### 28,226.—J. P. Wigal, of Henderson, Ky., for an Improved Apparatus for Feeding Sawdust to Furnaces:

I claim the arrangement of the automatically-closing flap-doors, E E, in combination with the reciprocating piston, G, and box, C, constructed and operating substantially as and for the purpose described.

[This invention consists in arranging in a box that extends over the whole width of the furnace, communicating with the same on either end, two flap-doors in combination with a sliding piston and counter-weights in such a manner that sawdust fed to the box is alternately discharged through one and through the other of the openings at the side of the box, said flap-doors being opened as the piston advances towards the same and closed when the piston recedes.]

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28,227.—J. S. Willson, of Waynesboro', Ga., for an Improvement in Plows:

I claim, in combination with the plow the beam and the false coulter, the standard made and connected therewith substantially as described.

28,228.—W. H. Wilson, of Denton, Md., for an Improvement in Automatic Raking Attachment for Harvesters:

I claim combining with a revolving post and a stationary cam, a mechanism substantially such as described, whereby a rake connected to said post shall have a revolving, reaching and tipping motion, as set forth, to adapt it to the sweeping of the platform of the cut grain and delivering it in a compact gavel on the ground, as described and represented.

28,229.—D. A. Woodbury, of Rochester, N. Y., for an Improvement in Air Pumps for Steam Engines:

I claim, first, The elongation of the piston of the air pump at one or both ends, substantially as herein specified to produce the result set forth.

Second, The arrangement of the three valve chambers, the valves, valve ports and passages, substantially as and for the purpose set forth.

28,230.—George Woods, of Boston, Mass., for an Improvement in Reed Musical Instruments:

I claim the application of a pressure escapement, substantially as described, to the reed and key, in order that on depression of the key the reed may be simply pressed upon or actuated without any percussive force and afterward set free and suffered to freely vibrate, as specified.

I claim the combination constituting the pressure escapement, and as arranged and applied to the key and the reed, substantially as specified, such combination consisting of the above-described spring slider, e, the fly or grasshopper, g, the weighted lever, h, and the lifting devices, n o, thereof, or their equivalent.

28,231.—H. A. Alden, of Matteawan, N. Y., assignor to the New York Rubber Company, for an Improvement in Hose Tubing:

I claim, as a new and useful improvement in a hose or flexible pipe or tube formed of woven fabric C, with a water-proof lining, substantially as specified, covering the inner edge of the tube at its longitudiuallap or joint, with a water-proof lapping strip, essentially as and for the purposes set forth.

28,232.—John Bawden (assignor to Gilbert Combs), of Freehold, N. J., for an Improvement in Potato-diggers:

I claim the employment or use of the two plows, D E, provided with the teeth or springs, d f, and applied to the foot or standard, C, of the beam, A, substantially as and for the purpose set forth.

[This invention consists in the employment or use of two double moldboard plows provided with teeth at their back ends, and attached to one and the same foot or standard in such a way as to act consecutively, or one after the other; the front plow, as the implement moves along, opening the hills or drills, nd partially elevating the potatoes, and the back plow fully elevating the same, and leaving them on the surface of the loose earth behind the implement.]

28,233.—L. W. Buxton (assignor to himself and Mark Starrett), of Nashua, N. H., for an Improved Bed Bottom:

I claim the removable rail, D, operating substantially as described, for the purpose specified.

28,234.—Elisha Clark (assignor to himself and J. W. Paddon), of New York City, for an Improved Paper File:

I claim the paper file described, made by arranging the grooved bar, 1, bar, 3, springs, 4 4, and bar, 7, in combination with each other in the manner described and shown; the parts being constructed substantially as and for the purpose set forth.

28,235.—R. B. Fitts (assignor to himself and W. L. Gilroy), of Philadelphia, Pa., for an Improved Ink Reservoir for Pens:

I claim making the said reservoir substantially in the manner described, of sheet metal perforated with numerous minute holes, as set forth and for the purpose specified.

28,236.—Charles Hunter (assignor to himself and Wm. Thornberry), of Indianapolis, Ind., for an Improvement in Grain Scales:

I claim, first, The peculiar-shaped balancing lever or beam, i, when constructed with the bifurcated curved ends in which the point of suspension for the weighing hopper is made, as and for the purpose shown.

Second, The combination of the trip lever, 5, with the cut-off, 6 and 7, when said lever is used for the purpose described.

Third, The horizontal balancing lever, 9, when constructed with poising and adjustable weight, s, at one end and used for the objects expressed.

Fourth, The perforated ratchet register wheel, e, with pin, g, and with slide and pawl, f, when the several parts are used in conjunction as shown in the preceding specification and for the purposes therein expressed.

28,537.—Wm. Kingsbury, of New York City, assignor to himself and J. J. Fields, of Brooklyn, N. Y., for an Improvement in Car Springs:

I claim the toggle arms, A A, arranged as specified to compress a spring between the ends of said toggle arms and give a yielding motion between the respective parts, as set forth.

I claim the arrangement of the toggle arms, A A, and bearing fork, C, combined with the rubber or elastic block, E, taking the plate, D, when under heavy compression, as set forth.

29,238.—S. J. Ladd (assignor to H. L. Webster & Co.) of Providence, R. I., for an Improved Metallic Cup and Stand:

I claim a new and improved metallic cup and stand, as a new and improved article of manufacture, the part composing the stand being the base of a truncated cone the sides being regular or irregular according to the taste of the workman—the whole made of a single piece of metal by the operation of spinning.

28,239.—W. J. McClelland (assignor to Ernest Greenfield), of New York City, for an Improvement in Machines for Cutting Lozenges:

I claim, first, The combination of rollers, B B', and plate, E, with the reciprocating cutters, a a a, and plungers, c c c, arranged in a suitable relation to each other and operating substantially as and for the purposes set forth.

Second, The perforated plate, P, interposed between the plate, E, and cutters, a a a, for cleaning the scraps from the cutters substantially as set forth.

28,240.—J. W. Murphy (assignor to A. Roberts and P. Roberts), of Philadelphia, Pa., for an Improvement in Iron Truss Girders:

I claim the combination of the within-described angle-iron chords, packing pieces, and posts or verticals, when applied and arranged in respect to each other as and for the purpose set forth.

28,241.—C. B. Richards, of Brooklyn, N. Y., assignor to S. J. Seely, of New York City, for an Improved Hook Catch for Doors:

I claim the combination of the hook, H, with the locking catch, S, constructed, applied and ope ating substantially as described, whereby the said catch can be operated to simply latch the hook in place or to securely lock the same as set forth.

28,242.—John Randall, of Elmira, N. Y., assignor to himself and R. R. Smalley, of Troy, N. Y., for an Improvement in Steam Engines:

I claim, first, The double cylinder engine constructed, arranged and operating substantially as set forth.

Second, In combination therewith, I claim the method described of gearing the said engine to the main or driving shaft, so as to dispense with the ordinary balance wheel.

28,243.—W. L. Williams (assignor to himself and T. J. O'Conner), of New York City, for an Improvement in Machines for Bundling Wood:

I claim, first, A series of clamps, k, acting on the ends of the split kindling wood, contiguous to the place from which the bundle is removed, for holding up the mass of wood as set forth.

Second, The sliding follower, b, in the trough, a, for moving the wood along in said trough and conveying it in into the bundling apparatus, as specified.

Third, The yielding semicircular supporting slide, f, taking the sides of the pieces of kindling wood as they stand in the trough, a, and assisting in gathering them in a bundle, and at the same time preventing them from falling down as pressed along in the trough, as set forth.

Fourth, I claim the revolving jaw, 4, and sliding blocking piece, 6, for receiving, holding and twisting the wire, as set forth.

Fifth, The jaw or jaws, r, between the bundle of kindling wood and the apparatus for twisting the wire—the same acting to confine the wire near the bundle while being twisted, as and for the purpose set forth.

Sixth, One or more expansive ring bands or wires applied to compress the wood into a compact bundle by drawing upon and tightening the said band or wire, for the purposes and as set forth.

28,244.—G. B. Arnold, of New York City, for an Improvement in the Manufacture of Ruffles:

I claim the ruffle described, as a new article of manufacture—the gathered cloth, A, being secured to the binding, B, by the single series of stitches, C, which perform the double duty of confining the gathers and of securing the gathered cloth to the binding, substantially as set forth.

RE-ISSUE.

Charles Eddy and Jacob Shavor, of Troy, N. Y., assignees, through mesne-assignments, of Henry Stanley, of Poultney, Vt., for an Improvement in Coal Stoves. Patented Jan. 4. 1845. Extended for 7 years. Re-issued April 10, 1860, and again Re-issued May 8, 1860:

We claim, first, The manner in which the inventor arranged and combined as a whole the two sections or stories thereof, consisting of two cylinders each, with four triangular radiating flues a ranged around and in contact with the same, one at each corner of the said plinth or base, which flues communicate with the flue space in the plinth or base, with the intermediate chamber, E, and with the cornice space, G, as described and represented.

We also claim the combination of the grate, i, with the intermediate chamber, E, substantially as and for the purposes herein set forth.

We also claim the combination of the upper section or story and the flues arranged and connected therewith with the intermediate chamber, E, or its equivalent, as and for the purpose specified.

We also claim the combination of the said shell or projection, x, with the said opening, s, to diffuse and heat the air preparatory to its entrance under and into the fire, to aid, facilitate and promote the combustion of the fuel, and to increase the volume or quantity of heat by means thereof, as described.

We also claim the combiration of the chamber, H, having therein the damper, o, and thereto attached the exit pipe, F, with the intermediate chamber, E, and the cornice, G, as described and set forth.

## Notes & Queries.

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

J. M. B., of N. C.—If you draw a line perpendicularly through the center of a carriage wheel, and then roll the wheel along, the top of the line will move faster than the bottom through the first quarter of the revolution, and more slowly through the second quarter.

D. E. S., of N. Y —It is not best to have grass or weeds growing about the roots of fruit trees. It is just as important that the ground about fruit trees should be cultivated as it is that the ground about corn should be. We have heard similar statements in regard to the glue of which you speak.

H. D. P., of Mass.—You have probably noticed that a previous correspondent assigns the invention of practical ice-boats an early date. The question is, are they yet perfect?

S. L. W., of Tenn.—Your questions, in regard to the arrangement of the stars, are so numerous that we must take space in the editorial columns to answer them, either in this issue or a future one. You are probably aware that the orbits of the planets are not exactly in the plane of the ecliptic, but inclined at small angles to it—all within the zodiac.

D. A. & Co., of Md.—Some recipes fail in one person's hands, while in those of another they are quite successful, because the one is careful to follow directions, while the other is not. You will find a receipt for gold ink in another column.

F. J. S., of Conn.—We do not know what you mean by "deodorized alcohol." If you intend to say the rectification of alcoholic liquors, animal charcoal is employed for this purpose; the liquor is simply filtered through a stratum of it. Cider would not be benefited by charging it with carbonic acid, for the purpose of facilitating its conversion into vinegar; the gas would operate to prevent such a result. "Muspratt on Chemistry," published by Russell & Bros., of Boston, is the work which appears most suitable for your use.

W. J. L, of N. Y.—Possibly we might think your demonstration (in which you prove that Sir Isaac Newton did not understand the precession of the equinoxes) worth publishing, but it must have some force in it to induce us to publish it.

C. D. S., of N. Y.—Metals are the best conductors of heat; silver and copper stand at the top of the list. Some stones and cements are the best non-conductors among mineral substances. We advise you to employ plaster-of-paris for any common purpose of non-conducting: it is about the cheapest and the best.

MUM.—We shall treat your communication as strictly confidential, and would like your address, so that we may obtain an interview with you.

W. X., of Tenn.—The word "patented," with the date, must be stamped on the article secured under the patent.

A. U. D., of Maine.—Small iron articles may be coated with bronze powders, mixed in some pale varnish. You can obtain such powders of any desired color—copper, green and brass.

J. H. L., of N. Y.—There is no uniform practice pursued by rifle makers as to the pitch of the thread in the barrel of rifles. If the twist is given so as to make one revolution in three feet, commencing the spiral slowly and increasing it towards the muzzle, it is considered pretty well proportioned for a common rifle. The practice is to use a slower twist for a long than a short barrel.

N. A., of N. Y.—Ascertain the quantity of water in cubic feet which passes over your fall per minute, then multiply it into the hight and by 62½, divide by 33,000, and you will have its horse-power. From the figures which you have sent us we cannot tell the quantity. You state that you will have to conduct the water 1,400 feet to the factory. If you bring it in underground, use a brick circular flume, lined with hydraulic cement.

W. A. C., of Conn.—To "draw" an even temper upon wire springs, after they are hardened, place them in an oven among fine white sand, heated to 530° Fah. As soon as the metal assumes a uniform purple-blue, withdraw it and cool in the open air. Those who harden springs by dipping them into oil after being heated red-hot, impart the spring temper by afterwards drawing through a clear fire, in which their temperature is raised to 530°. By the latter method wire can be easily tempered by being drawn off a reel on one side, through a fire, and wound upon another on the other side of the fire.

J. R. C., of Wis.—Common hoop iron can be made to resemble brass by scouring it bright with sand, water and a little dilute sulphuric acid. When the oxyd is removed, wash it clean and dry it with some warm sawdust, after which coat it with lacquer. The latter is a lac-varnish, colored like brass, with turmeric. The French nails to which you refer are plated with silver. You may coat iron nails with tin by removing the rust with sulphuric acid and water, then dipping them into a liquid of dissolved salammoniac, and from thence into an iron vessel containing molten tin. The heads of these nails can be planished.

## MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, May 12, 1860:—

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Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, May 12, 1860:—

G. & C., of N. H.; J. C. H., of Pa.; A. T. & Co., of Mass.; L. H. F., of Pa.; R. A. W., of Miss.; T. C. S., of N. J.; T. E., of R. I.; J. A., of N. J. (2 cases); J. T. S., of Va.; K. & T. F., of N. Y.; D. F., of Pa.; P. L. W., of Pa.; B. S. W., of Ohio; R. B., of N. Y.; W. McC., of N. Y.; J. S. S., of N. Y.; C. G. & H. M. P., of Mass.; I. E. T., of Conn.; C. L. W., of Fla.; L. W. H., of N. Y.; T. S. M., of Ohio; L. D., of Conn.; E. W., of Conn.; J. H. P., of R. I.; J. B. M., of Conn.; J. H. D., of Ky. (2 cases); A. H., of Iowa; T. M., of N. Y.; J. C., Jr., of N. Y.; W. G. S., of Ill.; W. & D., of Mass.; D. E., of Ill.; M. B., of Pa.; C. C., of Iowa.

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A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront recues en confidence.

MUNN & CO., Scientific American Office, No. 37 Park-row New York.

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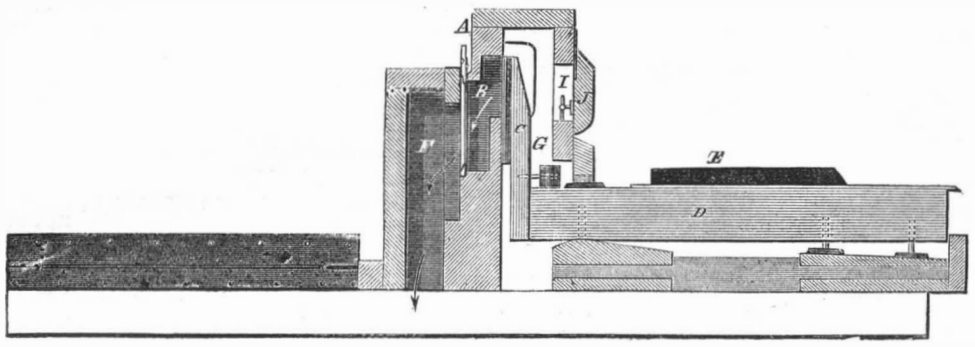
## IMPROVEMENT IN MELODEONS.

A melodeon is a musical instrument in which the sounds are produced by little strips of brass called reeds, firmly secured at one end, with the other end free, vibrating in a current of air. In the one represented in section in the annexed cut, the air is drawn in by a bellows operated by a treadle, through a series of holes, each supplied with a reed for producing its own note, and covered with a valve attached to a key, so that, by pressing the key, the valve is removed from its opening and the reed set in action. One of the reeds is represented at *a*, with its openings, B, before it, covered by the




MANNING'S IMPROVEMENT IN MELODEONS.

valve, C, which is screwed to the key, D; E being the key of the semitone adjoining. The air being drawn from the chamber, F, by the action of the bellows below, whenever the valve is opened by pressing upon the key a current of air rushes through the opening, and by vibrating the reed, produces the note. The air, before it reaches the valve, enters a swell box, G, in front, through an opening, I, which is closed by a valve, J, called the swell flap, and which is operated by a treadle. By opening more or less this swell flap, loudness of the tones is varied at the pleasure of the musician.

The invention here illustrated consists in the construction of a reed box, and in the arrangement of the several parts in the manner shown, by which it is claimed the following advantages are secured:—1. The sounding chest with the perpendicular reeds makes the instrument stiff and firm, and produces a deep, full and improved quality of tone. 2. The reeds are less likely to catch dirt, will remain in tune longer, and are more convenient of access for the purpose of being tuned. 3. The valves are secured to the keys in such manner that the dip of the keys may be easily adjusted to a perfect level. 4. The valves being outside the sounding chest, the inward current of air helps to close them, requiring less spring and making a very prompt and elastic action. 5. The manner in which the valves are attached to the keys dispenses with guide pins which have caused so much trouble in melodeons. 6. The whole arrangement is very simple, and forms a durable and substantial instrument which may be constructed at less expense than by the old plan.

The patent for this invention was granted June 3, 1856, and further information in relation to it may be obtained by addressing the inventor, William N. Manning, Salem, Mass.

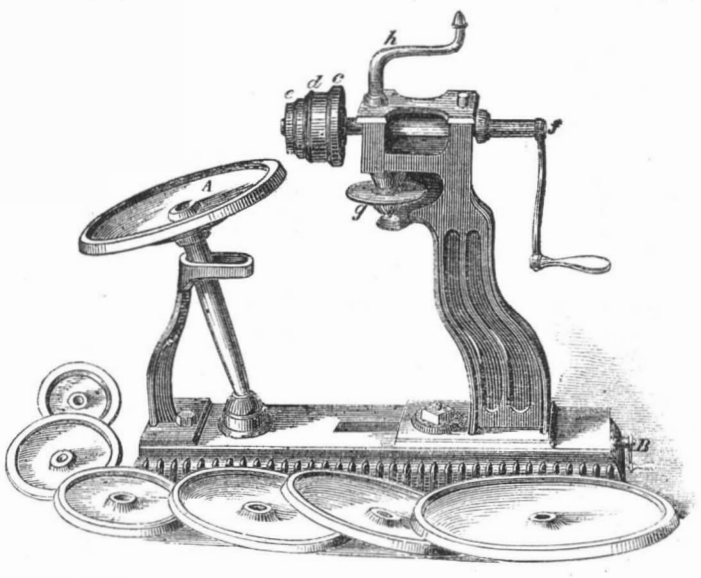
## CAUSE AND PREVENTION OF GRAPE ROT.

According to the theory of a writer in the *Southern Homestead*, the grape rot proceeds from a different cause than has generally been supposed. If the writer is correct, the season will soon be at hand for applying the prevention. It is certainly worthy the attention of those whose vineries have suffered from this malady. He says:—"Since I have lived in the United States, I have very often heard persons complaining of the rot of the grapes at the time they begin to ripen, and giving as the cause of it, the dampness of the atmosphere that prevails in the months of July and August. This is not the true cause of the rot. In the Spring, when the blossoms of the grape begin to open, a kind of bug, nearly like what is called the army worm, deposits its eggs in the blossom, where they remain until they are hatched, which happens when the berries have nearly attained their full size. They then force their way out, leaving a little hole or speck on the berry, and a few days after the fruit commences blackening and rottens, sometimes destroying whole bunches. A cheap and reliable remedy is simply to sprinkle lime dust on the vines in the morning, when they commence blossoming. The vines trimmed high are less liable to the injury of the bugs than those trimmed close to the ground."

## IMPROVED TIN PLATE "FORMER."

We presume that the workers of tin-ware alone will take any interest in the invention here illustrated, as it consists of an improvement in the machinery used in that manufacture. It is a machine for "setting down," "double seaming," and invariably deflecting the bottoms of tin-ware.

All of the above operations are performed with the tin plate resting upon the die, A. The shaft of this die rests at its lower end in a step which passes through the upper plate of the base of the machine, and is supported by an eccentric on the shaft, B, so that, by turning this shaft,




OLMSTED'S TIN PLATE "FORMER."

the die may be raised or lowered. For "setting down" the die is let down to its lowest position, so that, when its shaft is vertical, the working edge of the upper side of a die will be brought against the large roller, *c*, and its vertical edge against the roller, *g*; the shaft of the roller, *c*, being movable vertically to adapt it to this adjustment. One journal-box of the roller shaft, *f*, is raised and lowered by means of the screw, *h*, and when the parts are arranged as described, the screw, *h*, is turned so as to press the roller, *c*, with proper force upon the tin, when, by turning the roller, *f*, by means of the crank upon its end, the roller, *g*, as well as the die, A, with the tin plate upon it, is also rotated, and the setting down operation is neatly performed.

For "double seaming" raise the roller end of the shaft, *f*, about ten degrees from its horizontal position, the tin plate still remaining upon the die, draw back the shaft, *f*, till the shoulder rests against the front side of the journal-box, incline the shaft of the die about ten degrees from its vertical position, and thus bring the working surface of the die in proper relation to the roller, *e*. Now turn the shaft, B, so as to raise the die to its highest position, and screw down the roller shaft with proper force upon the tin. The parts thus arranged; if the shaft, *f*, is rotated, the die, A, is also carried around, and the double seaming is effected.

When the bottom of tin-ware is dished, it is deemed very desirable that the bearing surface should be near the edge of the bottom, and that all other parts should be concave. For accomplishing this, let the plate still rest upon the die, A, change the inclination and position of the shafts so as to bring the roller, *d*, in contact with the concave portion of the die, A, and rotate the shaft, *f*, as before.

The rollers, *c d* and *e*, may be made together on the shaft, or they may be made separately, and secured upon it in the usual manner. The standard in which the shaft, *f*, works is secured to the base of the machine by a screw, so that its position may be varied to adapt it to patterns of different forms and sizes.

The patentee of this machine says that it performs its several operations in the most perfect and satisfactory manner..

The patent was issued Jan. 17, 1860, and further information in relation to it may be obtained by addressing the inventor, Saml. J. Olmsted, Binghamton, N. Y.

## APPLICATIONS FOR THE EXTENSION OF PATENTS.

*Machines for Cleaning Buckwheat.*—Dan Pease, of Floyd, N. Y., has applied for the extension of a patent granted to him on the 14th of July, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 25th of June next; and the petition will be heard at the Patent Office on the 9th of July.

*Mode of Operating Treadle Cams in Looms for Tweeding.*—Richard Garsed, of Frankford, Pa., has applied for the extension of a patent granted to him on the 20th of July, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 2d of July next, and the petition will be heard at the Patent Office on the 16th of that month.

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